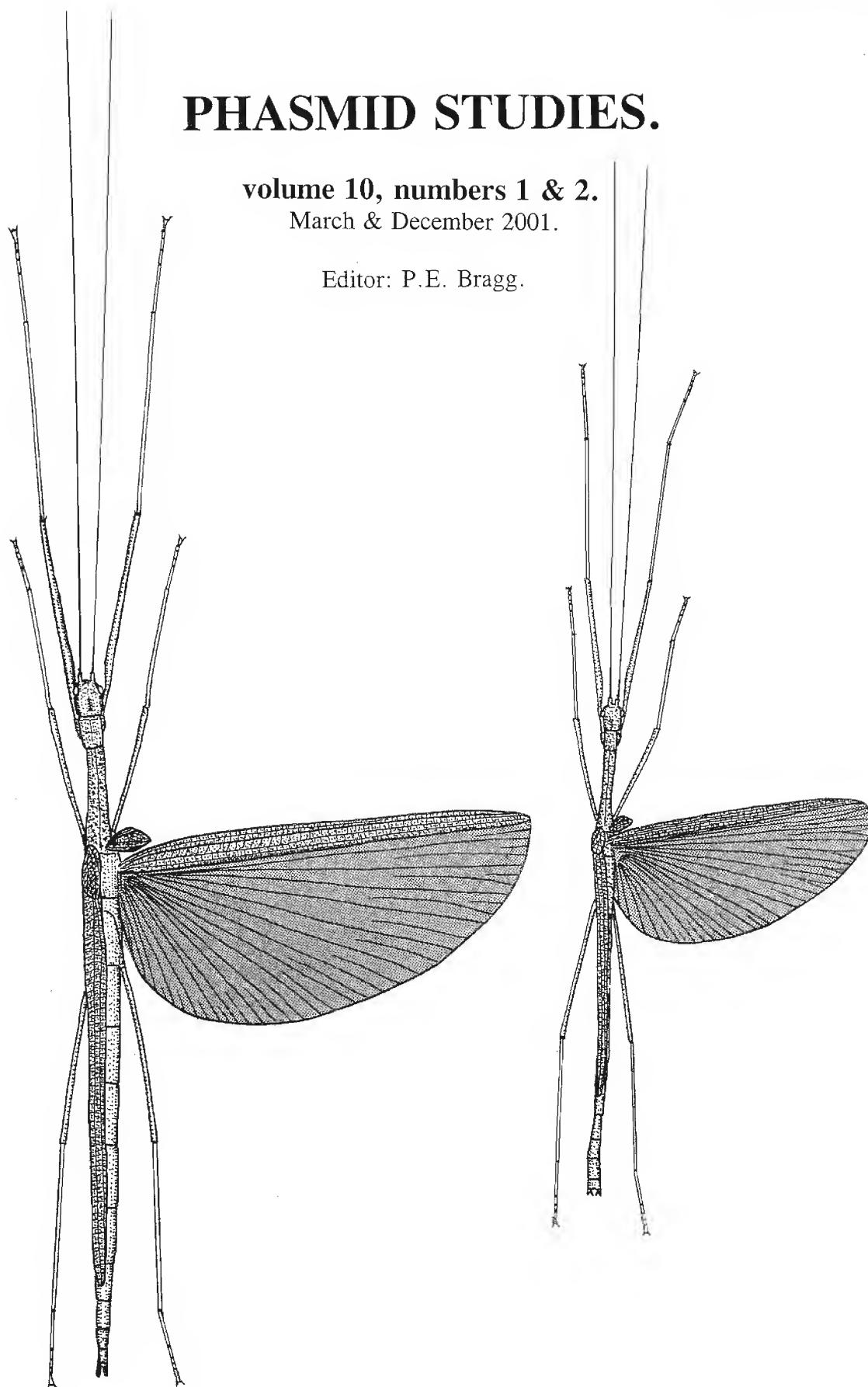


PHASMID STUDIES.

volume 10, numbers 1 & 2.

March & December 2001.

Editor: P.E. Bragg.



Published by the Phasmid Study Group.

Contents

Species Report PSG 213: <i>Malacomorpha jamaicana</i> (Redtenbacher, 1906) Isabella C. Brey	1
<i>Necroscia prasina</i> (Burmeister), a common red-winged phasmid in Borneo P.E. Bragg	6
Note on <i>Pseudodiacantha macklottii</i> (de Haan, 1842) Oliver Zompro	15
A new species of <i>Phanocles</i> from Ecuador (Phasmatodea: Diapheromeridae: Diapheromerinae: Diapheromerini) Oliver Zompro	17
A review of Eurycanthinae: Eurycanthini, with a key to genera, notes on the subfamily and designation of type species Oliver Zompro	19
Reviews and Abstracts Book Review Phasmid Abstracts	24 24
<i>Caledoniophasma marshallae</i> , a new genus and species of Phasmatodea Oliver Zompro	29
More Bornean records of <i>Necroscia prasina</i> (Burmeister, 1838) P.E. Bragg	34
<i>Menexenus exiguus alienigena</i> Günther, 1939 from Sulawesi P.E. Bragg	35
Stick Insects in Baltic Amber Oliver Zompro	41
Reviews and Abstracts Books & Compact Disks Phasmid Abstracts	45 46

Species Report PSG 213: *Malacomorpha jamaicana* (Redtenbacher, 1906)

Isabella C. Brey, School of Biological Sciences, University of Wales Swansea, Singleton Park, Swansea, SA2 8PP, UK.

Abstract

Malacomorpha jamaicana (Redtenbacher, 1906) came into culture within the PSG in 1999. Descriptions and illustrations of the adults, nymphs and eggs are provided as well as information on rearing and defence mechanisms.

Key words

Phasmida, *Malacomorpha jamaicana*, Pseudophasmatinae, rearing, defence, Jamaica.

Taxonomy

Malacomorpha jamaicana (Redtenbacher, 1906), originally described as *Anisomorpha jamaicana*, and recently transferred to *Malacomorpha* by Zompro, belongs to the subfamily Pseudophasmatinae (order Phasmida, suborder Areolatae, family Pseudophasmatidae). The syntype series (from Jamaica, collected by Burr) consists of three females and one male, housed in the Naturhistorisches Museum Wien, and the Institut Royal des Sciences Naturelles de Belgique, Brussels respectively (P. Brock, pers. comm.).

Culture History

The founder stock consisted of two adult mating pairs and a small number of nymphs collected by Tony James near Portland, Jamaica, in March 1999 (T. James, pers. comm.). Due to good rearing success, the species is now becoming common within the Phasmid Study Group.

Distribution

Malacomorpha jamaicana is endemic to Jamaica (P. Brock, pers. comm.).

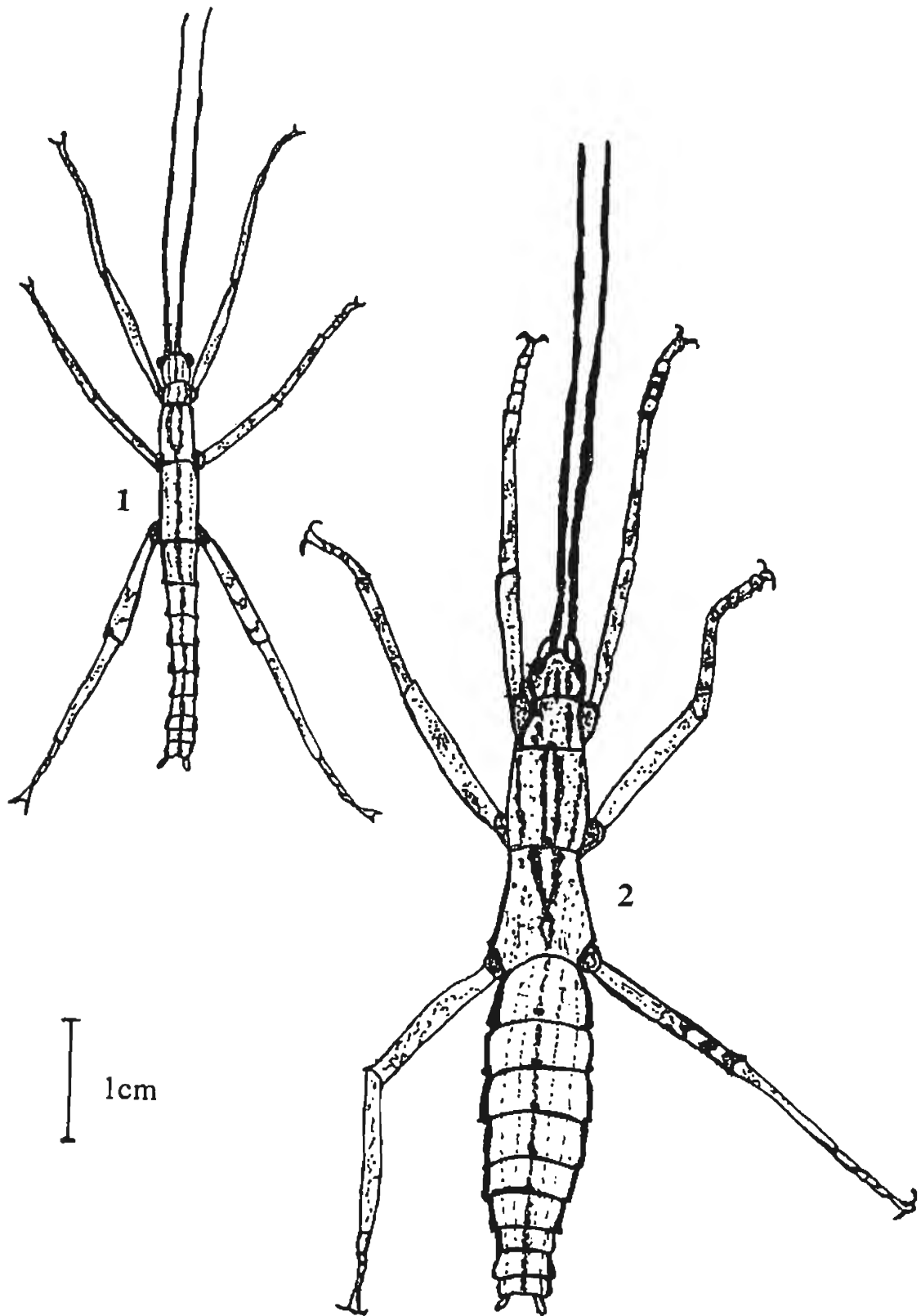
Descriptions

All sizes in this section represent the mean measurements of three individuals.

The adult male (Fig. 1)

The adult male reaches a length of 36mm from the front of the head to the tip of the abdomen. The type specimen measures 32mm (Redtenbacher, 1906: 94). Seen from above, it reaches a width of 3mm at its widest point. The antennae measure 30mm when intact, but are frequently broken off. The front legs are shorter than the antennae (reaching 21mm), the middle legs are short (only reaching 16mm), whereas the hind legs reach 23mm. There are two short cerci (<1mm) at the tip of the abdomen.

The coloration of the sexes is similar. The adult male is a dull brown with an intricate pattern of fine, lighter and darker brown, longitudinal stripes. There is a wider dark brown to black stripe dorsally along the midline spanning all ten abdominal segments. It continues on to the metathorax, where it separates into two fine parallel lines extending forward to the front end of the mesothorax. The eyes protrude slightly and are brown with some lighter lines across them. Behind each eye, a lighter band extends back along the head to the front of the prothorax. The antennae show some light and dark banding. The legs also have some banding and mottling. An interesting feature is the light coloured V-shaped mark that is visible on each femur when seen from the front. This mark is particularly well developed on the front and mid femora, and is also present in the female. The coxae are large and well developed, making the insect's body look wider than it actually is. At the front corners of the prothorax, the openings of the secretory glands are visible as raised circular areas.



Figures 1 & 2. *Malacomorpha jamaicana*. 1. Male; 2. Female.

The adult female (Fig. 2)

The adult female is considerably larger than the male, reaching a length of 58mm and a width of up to 8mm when egg laying. Interestingly, the mean length of the type specimens is given as only 49.5mm (Redtenbacher, 1906: 94). The antennae reach 40mm and are usually intact. The front legs are shorter than the antennae (30mm), the middle legs are the shortest (24mm) and hind legs the longest (32mm). The female also possesses two short cerci (<1mm) on the tip of the abdomen.

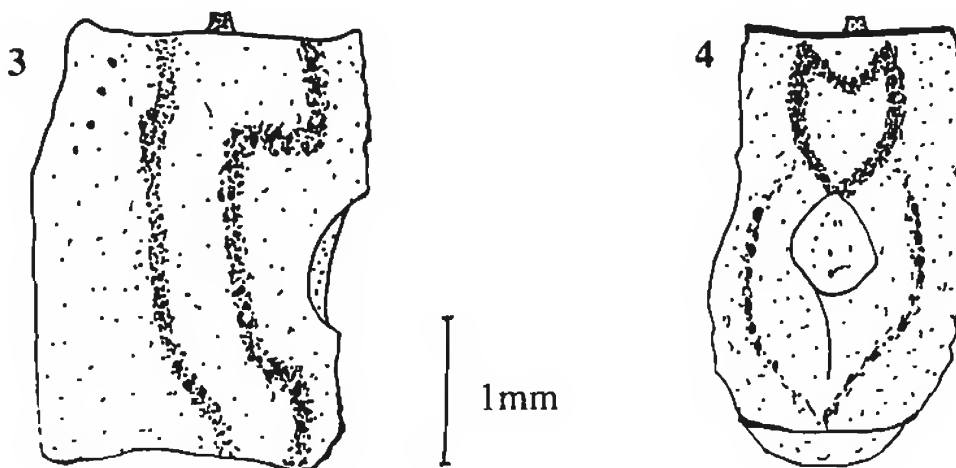
Although the coloration of the adult female is similar to the male, she tends to be lighter. There are small light markings on the rear corners of each abdominal segment. Dorsally in the centre of each abdominal segment, towards its hind margin, there is a small tubercle with a light coloured tip. On each side of the metathorax there is a light coloured oval area with a rugged edge. The banding and striping is essentially the same as described for the adult male. Again, the coxae are large and the openings of the prothoracic glands are clearly visible.

Nymphs

Newly hatched nymphs are uniformly dark brown in colour. They measure 9mm from the front of the head to the tip of the abdomen and are 1mm wide. The antennae reach 5mm. The front, middle and hind legs measure 9, 7 and 8mm respectively. From the second moult, lighter brown patches start to develop. Hatching seems to take place exclusively at night.

Eggs (Figs. 3 & 4)

The eggs are roughly cylindrical measuring approximately height 3mm, length 2mm, width 1.5mm. Their colour ranges from greyish green to greyish brown. The surface is rough with more or less well developed granules forming a pattern in places. The contents of the eggs are a reddish purple.



Figures 3 & 4. Egg of *Malacomorpha jamaicana*, 3. Lateral view; 4. Dorsal view.

Defensive behaviour

Malacomorpha jamaicana is capable of producing a powerful defensive secretion from a pair of prothoracic glands. This milky secretion can be sprayed as a fine (nearly invisible) mist and causes strong irritation of the eyes and nasal mucosa up to one metre away from the insect. The secretion is so strong that it proves noticeable from a nymph's first moult. In one instance, where the secretion was not washed off the skin, blistering occurred. *Malacomorpha jamaicana* is considered more potent and more likely to spray than members of the related genus *Anisomorpha* by some, less so by others (I. Abercrombie, pers. comm., T. James, pers. comm.). The author has found the species highly irritable and the spray extremely potent.

If handling becomes necessary, it has been found easiest to provoke an 'all-out attack' on a rubber gloved hand by quickly placing it over and around the insect's thorax, thereby confining the spray, which can then easily be wiped off the glove. It seems that, for at least one hour afterwards, the insect is unable to spray again and can be handled fairly safely.

If the spray fails to deter a predator, or a well meaning keeper, *A. jamaicana* will try to escape by running away very fast for quite some distance before freezing. It seems to prefer a dark background for this immobility response.

In cases of minor disturbance, slight swaying motions, similar to those found in *Carausius morosus* (Sinéty), have been observed.

Rearing

A hatch rate of 100% was achieved by placing the eggs in a ventilated plastic box lined with tissue paper and spraying the lid twice weekly with lukewarm water. During incubation, the box was maintained at room temperature (20-25°C). Eggs took between four and six months to hatch.

The nymphs accepted privet (*Ligustrum* sp.) readily and reached adulthood within four to five months.

Adult males appear to have a shorter lifespan than females, with few reaching an age of more than six months (females have been recorded to live up to eight months). On average, females lay around 15 eggs per week, which are dropped to the bottom of the cage. Males tend to associate themselves with a female when adult by sitting on her back, but this association does not seem to be lifelong as in *Anisomorpha monstrosa* Hebard (Hoskisson, 2001).

While actually mating, it seems to be very difficult for the male to detach itself from the female when disturbed. Males were observed being dragged along behind the female as she was trying to escape. One should therefore avoid disturbing mating pairs wherever possible.

The fact that the majority of males show severely shortened antennae gives rise to the question whether this may be the result of fights between rival males, one attempting to dislodge the other from a female's back.

All stages seem to appreciate reasonably high humidity, such as in a propagator. If they are kept in airier cages, the food plants should be sprayed regularly. Room temperature seems adequate for successful development of nymphs and maintenance of adults. *Malacomorpha jamaicana* does not appear to like being exposed to a heat source, such as a lamp, generally causing them to move away. Light alone does not result in such a response.

Both nymphs and adults are gregarious and gather together in tight bundles, sometimes several insects thick, during the day.

Unlike the majority of stick insects, they produce fairly sticky droppings, so lining the cage with paper will facilitate the cleaning process.

Overall, this is a straightforward species to keep and rear with very good hatch rates and low mortality of nymphs. Due to its defensive spray, however, it can not be recommended in those cases where children could come into contact with it or where the rearer is prone to asthma or allergies.

Acknowledgments

Thanks are due to Paul Brock for all his patience and support during the creation of this report. Thanks also to Ian Abercrombie and Tony James for interesting discussions and information supplied.

References

Hoskisson, P.A. (2001) Species Report PSG 122, *Anisomorpha monstrosa* Hebard. *Phasmid Studies*, 9(1&2): 1-3.
Redtenbacher, J. (1906) *Die Insektenfamilie der Phasmiden*, Volume 1. Engelmann, Leipzig.

Necroscia prasina (Burmeister), a common red-winged phasmid in Borneo

P.E. Bragg, 8 The Lane, Awworth, Nottingham, NG16 2QP, U.K.

Abstract

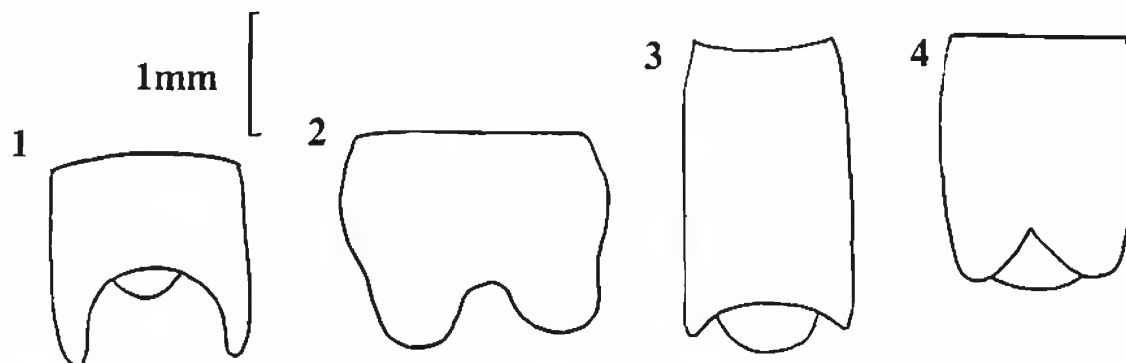
Necroscia prasina is a widespread, common species of phasmid in Borneo. Although brightly coloured, identification is not simple. The male, female and egg are described and illustrated. Illustrations of the similarly coloured West Malaysian *Necroscia inflata* are provided for comparison.

Key words

Phasmida, *Necroscia prasina*, Borneo.

Introduction

Necroscia prasina (Burmeister) was the first species of phasmid to be described from Borneo. It is common and widespread in Borneo, and it has also been recorded from Java, Sumatra, the Philippines, Singapore and West Malaysia. The typical coloration of green body and red wings is very striking but there are a number of similarly coloured species in Borneo, in addition the coloration is variable and there are several similarly sized and proportioned species. Brock's key to West Malaysian species of *Necroscia* (Brock, 1999: 93) uses the coloration of the wings to distinguish this species from the similarly coloured *Necroscia inflata* (Redtenbacher). The coloration of my own Bornean material of *N. prasina* is such that it can not be used to distinguish it from my West Malaysian and Singaporean specimens of *N. inflata*. Colour is therefore only of limited value in identifying this species. Examination of the terminal abdominal segments is a reliable method of distinguishing both the males and female of these two species (Figs. 1-4).



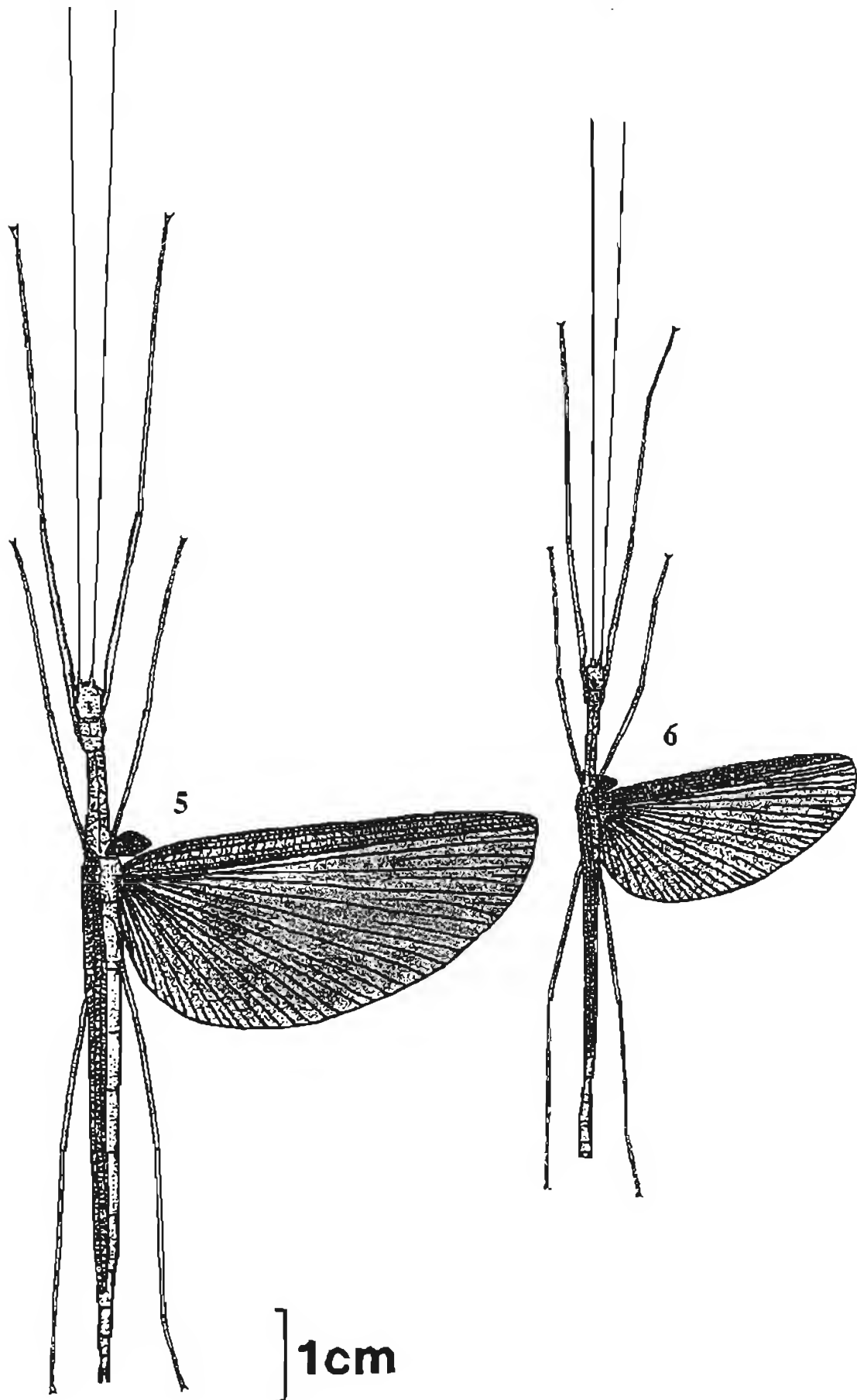
Figures 1-4. Apex of abdomen: 1. *Necroscia prasina*, male; 2. *Necroscia inflata*, male; 3. *Necroscia prasina*, female; 4. *Necroscia inflata*, female.

Taxonomy

Necroscia prasina belongs to the Necrosiinae, the largest group of phasmids in Borneo. This species has been described as new by three different authors: Burmeister (1838), Audinet-Serville (1838) and Redtenbacher (1908).

The valid name for the species is *Necroscia prasina* (Burmeister) since Burmeister's publication of 1838 pre-dates Audinet-Serville's publication of *Phasma roseipennis* (which was in the last week of December 1838). However, for many years most authors used the name *Necroscia roseipennis*.

Burmeister described his species in the genus *Phasma*, as *Phasma prasinum*. Audinet-Serville described a different species, from South America, and gave it the same name. These two are therefore homonyms (two different species with the identical name). Westwood (1859) recognised this and proposed the replacement name *Necroscia burmeisteri*, for *Phasma prasinum* Burmeister; however, this is invalid because he replaced the senior name when he should have replaced the junior name. *Phasma prasinum* Audinet-Serville has



Figures 5-6. *Necrosia prasina* (Burmeister), 5. Female; 6. Male.

recently been replaced with *Citrina servillei* Zompro (2000: 94).

Necroscia prasina has been mentioned in the literature on numerous occasions, although often as *Necroscia roseipennis*; a complete list of references is given in the synonymy below.

***Necroscia prasina* (Burmeister, 1838)**

Phasma prasinum Burmeister, 1838: 586. Lectotype ♀ (ZMHB) Borneo; Paralectotype ♀ (not located by Brock, 1996a) Java [Lectotype designation by Brock, 1996a: 91].

Necroscia prasina (Burmeister); Brock, 1999: 97, figs 60a-b (♂), 60c-d (♀); Bragg, 2001: 573, figs 227A (♂), 227B (♀), 227C-D (egg).

Necroscia burmeisteri Westwood, 1859: 151; Kirby, 1904: 376. [An invalid replacement name for *Phasma prasinum* Burmeister, not *P. prasinum* Audinet-Serville].

Necroscia roseipennis Audinet-Serville, 1838: 252; Westwood, 1859: 151; Kirby, 1904a: 437; Kirby, 1904b: 376; Karny, 1923: 241; Günther, 1943: 165; Hausleithner, 1991: 221; Seow-Choen *et al.*, 1994a: 11 fig 2 (♂); Seow-Choen *et al.*, 1994c: 71, pl. OO.1 (♀), OO.2 (♀), PP.3 (♂ & ♀), PP.4 (♂); Seow-Choen *et al.*, 1994d: 394, fig (♂ & ♀); Brock, 1996a: 91. Syntypes ♂ & ♀ (Audinet-Serville's collection) Java. Synonymised by Redtenbacher, 1908: 526 [using *roseipennis* as the senior name].

Phasma (Necroscia) roseipenne Audinet-Serville; de Haan, 1842: 121.

Aruanoidea roseipennis (Audinet-Serville); Redtenbacher, 1908: 526. pl. 27.10a-b (♀); Werner, 1934b: 3.

Aruanoidea connexa Redtenbacher, 1908: 525. Holotype ♀ (NHMW, 1032) Malaysia, coll. Jachau. Synonymised by Brock, 1996a: 91.

Material examined

In the following list SMSM refers to the Sarawak Museum in Kuching. PEB refers to material in my own collection, these specimens were collected by myself unless otherwise indicated. The SMSM material has been used solely for the distribution map; the descriptions are based on my own material only. Measurements in table 1 are taken from my longest and shortest specimens.

BRUNEI

Locality not specified: ♀ (SMSM-335) Waterstradt van der Poll [no date].

Badas: ♂ (PEB-2365) 31.x.1994; ♀ (PEB-2361). ♂ (PEB-2364) 01.xi.1994.

Teraja, waterfall trail: ♀ (PEB-2363) 03.xi.1994.

SABAH

Mt Kinabalu Park, near Park HQ, 1580m: ♂ (PEB-1709) 30.viii.1992.

SARAWAK

Lundu: ♀ (SMSM-332) 24.xi.1915.

Trusan: ♀ (SMSM-333) xi.1902.

Kuching: ♂ (SMSM-334) 01.ii.1896.

Santubong: ♂ (SMSM-487) 20.iv.1970; ♀ (SMSM-488) 15.iv.1970.

Bengoh: ♂ (PEB-1044) 28.vii.1989.

43km NE of Selangau: ♂ (PEB-2347), ♀ (PEB-2348), ♀ (PEB-2362) 26.x.1994.

Mt Serapi, 90m: ♀ (PEB-1601), eggs (PEB-1602) 05.viii.1992

Mt Serapi, 120m: ♀ (PEB-897) 26.vii.1991.

Mt Serapi, 240m: ♀ (PEB-894) 28.vii.1991.

Mt Serapi, 600m: ♀ (PEB-893) 13.viii.1990.

Mt Serapi, 670m: ♂ (PEB-896) 27.vii.1991.

Mt Serapi, 700m: ♀ (PEB-898) 27.vii.1991; ♀ (PEB-1575) 14.viii.1992.

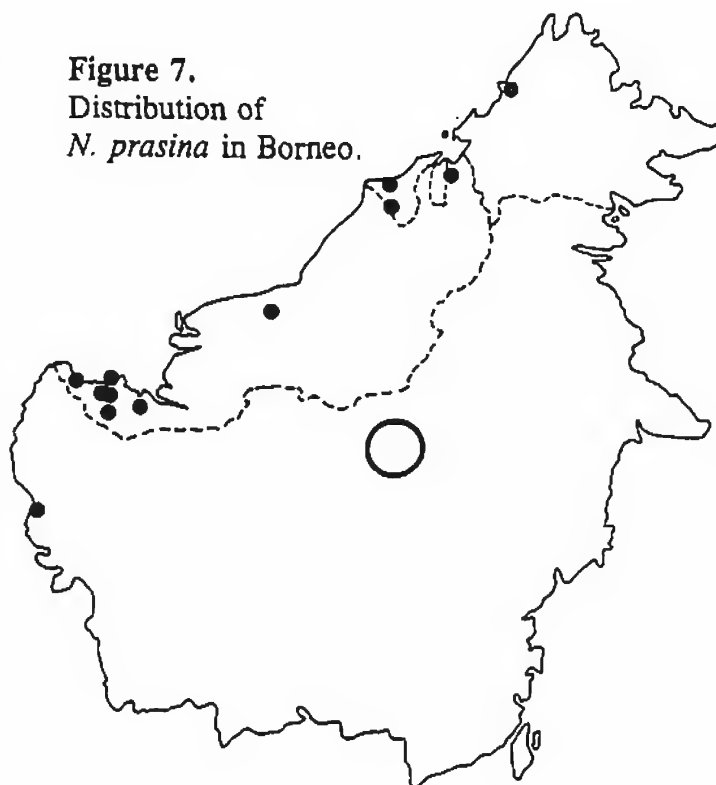
Mt Serapi: ♀ (PEB-1043) 12.viii.1989; ♀ (PEB-1875) collected by Ricky Lee, viii.1992

Simunjan: ♀ (PEB-895) 17.viii.1991.

Distribution (Fig. 7).

This species has quite a widespread distribution; it has been recorded from Java, Borneo, Sumatra, the Philippines, West Malaysia, and Singapore. Within Borneo it has previously been recorded from Babaggon (Hausleithner, 1991), Pontianak and Barito River (de Haan, 1842), and Mahakam (Günther, 1943). Although it probably relates to the region around Banjarmasin, de Haan's record for Barito River is not plotted on the distribution map since it is very long, almost bisecting Kalimantan; Günther's record for the Mahakam river relates to somewhere within, or close to, the large circle (Bragg, 2001: 47).

Figure 7.
Distribution of
N. prasina in Borneo.



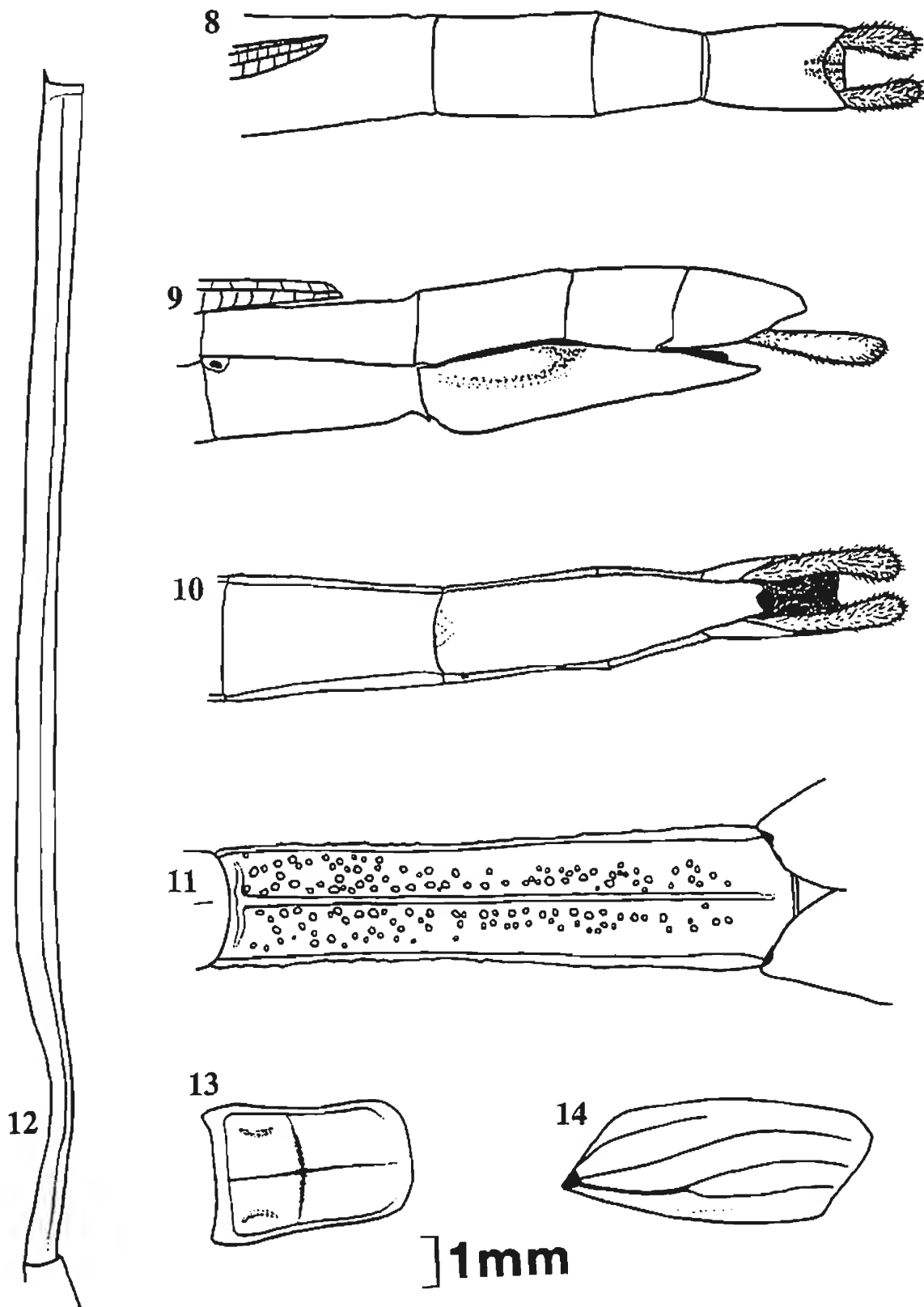
Female (Figs. 3, 5 & 8-14).

Head, body, legs and costal region of the wings usually mid-green, occasionally brown; the portion of the abdominal nota covered by the wings is reddish; anal region of wings pale pink to red, occasionally overlaid with a greyish tinge. Head with a longitudinal pale, almost white, line running from the back of each eye; this continues along the lateral margins of the pronotum but is present only very indistinctly on the mesonotum; the radial vein of the hind wing tends to be paler than the rest, giving the impression that the pale stripe continues along the whole insect. In live specimens the underside of the body may appear to be white. Eyes are brown or reddish brown. Antennae dark, becoming slightly lighter distally. Mesothorax granulose, rest of body smooth. Body length 71-81mm, full measurements in table 1, width of middle of mesonotum about 2.2mm.

Head flat, with eyes projecting prominently from the side. Head about one fifth longer than wide (excluding the eyes), of similar width if the eyes are included. Head with a slight longitudinal furrow and three ocelli. Basal segment of antennae twice as long as wide, flattened; second segment cylindrical, almost half as long as first and only slightly narrower; remainder half as wide as second, indistinctly segmented.

Pronotum (Fig. 13) one-and-a-half times longer than wide, broadest at the anterior, narrowest in the middle, anterior margin slightly indented; with a curved transverse groove just anterior of the mid point, with a slight longitudinal groove. Mesonotum granulose, granules extending the full width at the anterior but restricted to an area close to the centre line at the posterior (Fig. 11); mesonotum with a raised central longitudinal ridge and raised granulose margins. Mesopleurae with a narrow longitudinal band of granules. Mesosternum sparingly granulose. Metanotum and median segment usually obscured by the elytra and wings, metanotum very slightly longer than median segment.

Segments 2-7 of almost uniform width (about 3.5mm); 2-6 of equal length, 7th about two-thirds as long. Segments 8-10 narrowing, 8th and 10th only slightly longer than wide, 9th as wide as long. Postero-lateral corners of 10th projecting (Figs. 3 & 8). Lamina



Figures 8-14. *N. prasina*, female. 8-10. Abdomen: dorsal, lateral & ventral views; 11. Mesonotum; 12. Right fore femur, dorsal view; 13. Pronotum; 14. Left elytron.

supraanal is rounded, projecting just beyond the postero-laterals of the 10th segment. Operculum reaching almost to the posterior of 10th tergum, with anterior end almost semi-circular in cross-section, reducing in height towards the rear, with a "V" shaped notch in the posterior margin (Fig. 10); there is a depression near the proximal end of the dorsal margin. Cerci prominent, projecting beyond the end of the abdomen, rounded, swollen towards the posterior.

Base of fore femora compressed and curved (Fig. 12). All five carinae are very distinct on the fore legs but rather indistinct, particularly ventrally, on the mid and hind legs. Femora and tibiae all without spines, but with a row of setae on the carinae, these are particularly strong on the fore legs. Basal tarsomere of similar length to combined length of tarsomeres 2-5: slightly longer on fore leg, slightly shorter on middle and hind legs. Elytra rhomboidal when viewed dorsally (Fig. 14), fairly flat. Wings reaching to half way along 7th segment (slightly variable), radial vein unbranched; anal region with all veins red or pink, the membrane between paler pink.

Table 1. <i>Necroscia prasina</i> — measurements in mm.					
	♂	♀		♂	♀
Total length	49-56	71-81	Fore femora	16.5-19	21-23
Antennae	51-62	70-78(+?)	Fore tibiae	15-17.5	19-22.5
Head	2.3-2.5	3.1-3.9	Fore tarsi	8-10	10.5-11
Pronotum	2.1-2.3	3.8-4.0	Mid femora	11-13.5	13-15
Mesonotum	7.8-8.7	21-22.5	Mid tibiae	9.5-11.5	11-13.5
Metanotum	3.6-4.8	6.5-7.5	Mid tarsi	5-6	6.5-7.0
Median segment	3.4-4.2	6.0-6.5	Hind femora	15.5-17	18-20
Elytra	3.0-3.6	5.2-6.1	Hind tibiae	14-17	15.5-17.5
Hind wing	26-30	45-47	Hind tarsi	7-7.5	8-8.5

Male (Figs. 1, 6 & 15-18).

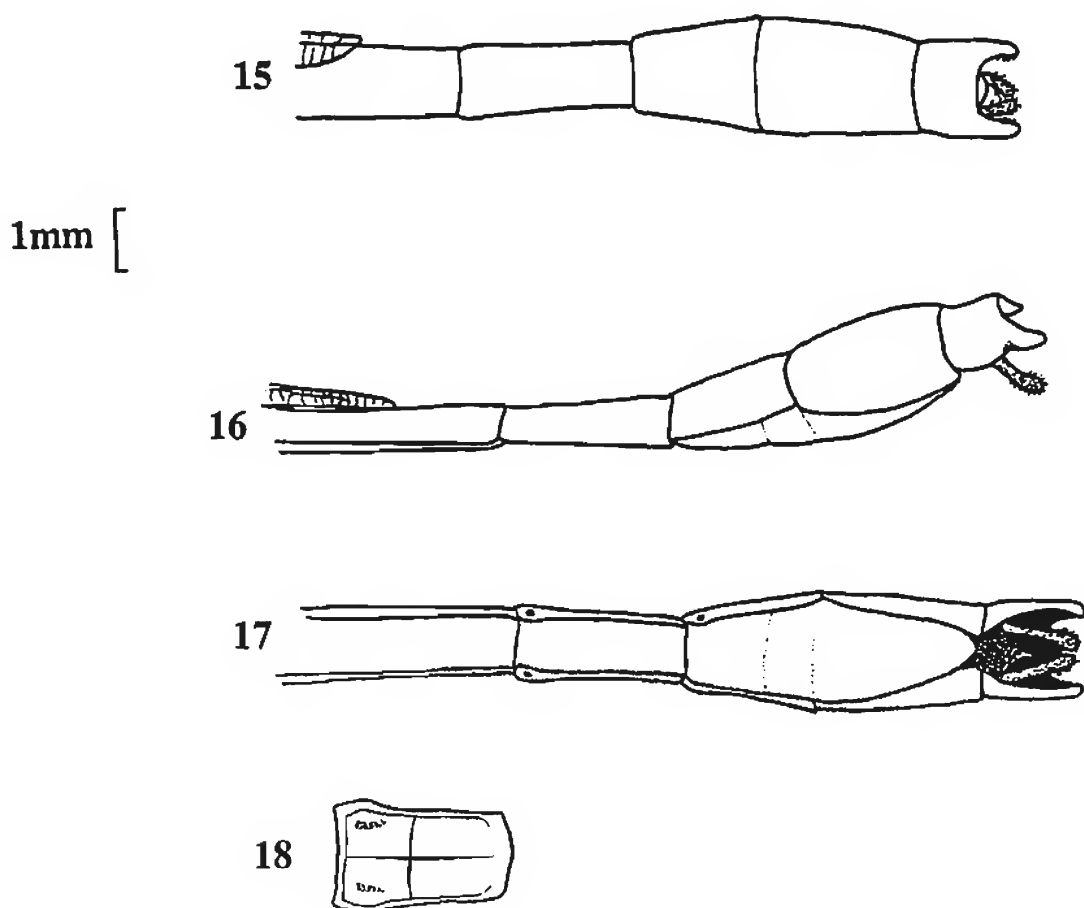
Coloration as in the female, but one male has green eyes. Body proportions similar to female but more slender, width of middle of mesonotum about 1.5mm. Body length 49-56mm, full measurements in table 1.

Head about one-and-a-half times longer than wide (excluding eyes), as long as wide with eyes included. Otherwise as in female.

Thorax, including granulation, as in female.

Abdominal segments 2-6 of equal length and narrowing only very slightly, about four times longer than wide; 7th of similar width but only about half as long. Segments 8th widening to almost double the width of 7th; 9th and 10th of equal width to posterior of 8th. Segments 8 & 9 slightly shorter than 7th. Tenth segment only slightly more than half the length of 9th, postero-lateral corners project greatly, at the centre line the 10th segment is only one quarter as long as 9th segment. Postero-lateral corners of 10th with about 20 hooked teeth on the ventral surface. The joints between segments 7-10 have a rounded depression, usually brown in colour. Lamina supraanal is semi-circular with a longitudinal carina, usually clearly present but not projecting beyond the postero-lateral corners of the 10th segment; in preserved material at least the lamina supraanal is may be folded under the 10th segment. Poculum reaching to the end of the 9th dorsum, rounded, smooth. Cerci not as prominent as in the female, swollen, club-like.

Legs as in female, except basal tarsomeres which are slightly longer than tarsomeres 2-5 on both the fore and hind legs, slightly shorter on mid leg. Wings reaching to half way along 6th segment, otherwise as in the female.



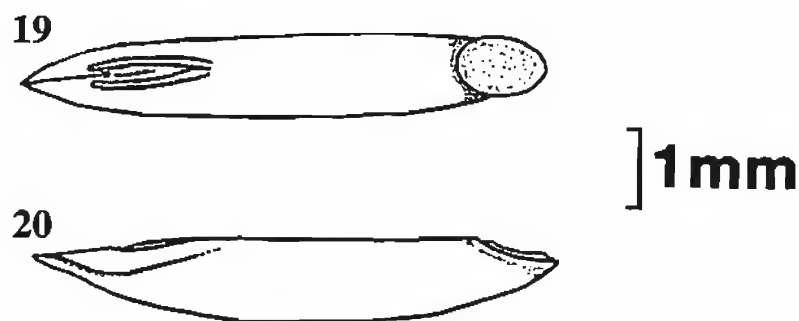
Figures 15-18. *Necroscia prasina*, male; 15-17. Apex of abdomen: dorsal, lateral & ventral views; 18. Pronotum.

Egg (Figs. 19-20).

Capsule cylindrical with polar end almost conical, dorsal surface straight, ventral surface curving at each end. Opercular angle about $+90^\circ$. Capsule and operculum almost smooth (very finely punctate); polar end with three short ridges. Capsule light grey, darker at the opercular end of dorsal surface, ridges at polar end black. Micropylar plate close to polar end, long and slender with a groove in the capsule on each side of the plate. Capsule length 7.0mm, height 1.0mm, width 1.0mm.

Comments

Seow-Choen *et al.* (1994c) report various colour forms in West Malaysia but do not state the frequency of the different forms. Only one of the 19 specimens in my collection is brown; I have found more green specimens than I have collected, but I have only found the single



Figures 19-20. Egg of *Necroschia prasina*, 19. Dorsal view. 20. Lateral view.

brown specimen, a female (PEB-2348) from roadside vegetation 43km NE of Selangau. My green bodied specimens have wings with variously coloured anal regions, ranging from pale pink to the more common red, one male (PEB-2347) has an equal mixture of grey and pink, a green female (PEB-2362) from the same locality also has some grey mixed with the pink. Seow-Choen *et al.* also clearly state, and show in colour photographs, that the antennae have seven white bands distally. These bands do not occur in my preserved Bornean material and are not present on any of my photographs of live material in Borneo; it is possible that this is a geographical variation.

My material has been collected at various altitudes, from 90-1580m. Altitude does not appear to have any effect on size, the specimen from 1580m falls within the range of sizes found in lowland areas. I have found this species in most areas where I have collected for more than one night, including on the fringes of peat-swamp forest at Simunjan; however, I did not find this species during a two-week stay in a peat-swamp at Kelambenkari in Kalimantan Tengah in 1993 although another red-winged species *Marmessoidea quadriguttata* (Burmeister) was common in the area. Similarly, I did not find this species during a 12 night stay in primary lowland forest at Kuala Belalong in Brunei. It is possible that this species prefers secondary forest, one of the foodplants, wild cinnamon only reaches about 10m in height (Seow-Choen *et al.*, 1994c); cinnamon is therefore likely to be more common in secondary forest.

In my own Bornean collection there are eight other similarly coloured species (i.e. green with pink or red wings) of various sizes. At least two of these have females which could easily be confused with *Necroschia prasina*: one of these also has almost identical terminal segments but may be distinguished, with the aid of a microscope, by the shape of the operculum, head, and base of the fore legs.

One would expect brightly coloured phasmids to be easily to identify compared to the more common dull species. Whilst identification of such species is relatively easy, there are still problems caused by variation in coloration and by original descriptions and illustrations which are inadequate for distinguishing similar species.

References

- Audinet Serville, J.G. (1838) *Histoire Naturelle des Insectes. Orthoptères*. Paris.
Bragg, P.E. (2001, in press) *Phasmids of Borneo*, Natural History Publications (Borneo), Kota Kinabalu, Sabah.
Brock, P.D. (1996a) Catalogue to stick and leaf-insects (Insecta: Phasmida) associated with Peninsular Malaysia and Singapore. *Malayan Nature Journal*, 49(2): 83-102. [Journal is dated November 1995 but was published 26.ii.1996]
Brock, P.D. (1999) *Stick and Leaf Insects of Peninsular Malaysia and Singapore*. Malaysian Nature Society, Kuala Lumpur.

- Burmeister, H. (1838) *Handbuch der Entomologie*, Volume 2. Berlin.
- Günther, K. (1943) Die Phasmoiden (Orthoptera) der "Borneo-expedition Dr. Nieuwenhuis" aus dem Stromgebiet des oberen Mahakam. *Eos Madrid*, 19: 149-172.
- Haan, W. de (1842) Bijdragen tot de Kennis Orthoptera. in C.J. Temminck, *Verhandelingen over de natuurlijke Geschiedenis der Nederlandsche overzeesche Bezittingen*. volume 2.
- Hausleithner, B. (1991) Eine Phasmidenausbeute aus dem Gebiet des Mount Kinabalu, Borneo (Phasmatodea). *Nachrichten des Entomologischen Vereins Apollo, Frankfurt*, N.F. 11(4): 217-236.
- Karny, H.H. (1923) Zur Nomenklatur der Phasmoiden. *Treubia*, 3(2): 230-242.
- Kirby, W.F. (1904a) Notes on Phasmidae in the collection of the British Museum (Natural History), South Kensington, with descriptions of new genera and species. - No. II. *Annales and magazine of natural History*, (7)13: 429-449.
- Kirby, W.F. (1904b) *A synonymic Catalogue of Orthoptera*. Vol. 1. London.
- Redtenbacher, J. (1908) *Die Insektenfamilie der Phasmiden*. Vol. 3. Leipzig.
- Seow-Choen, F., Brock, P.D. & Seow-En, I. (1994a) The Stick Insects of Singapore. *Singapore Scientist*, 70: 10-14.
- Seow-Choen, F., Brock, P.D. & Seow-En, I. (1994b) An introduction to the stick and leaf-insects of Singapore. *Malayan Naturalist*, 48: 7-11.
- Seow-Choen, F., Brock, P.D. & Seow-En, I. (1994c), Colour variations of the stick insect *Necroscia roseipennis* Serville (Phasmida = Phasmatodea) in Singapore. *Bulletin of the Amateur Entomologists' Society*, 53(393): 71-73, pl. OO & PP.
- Seow-Choen F., Tay, E.P., Brock, P.D. & Seow-En, I. (1994d) Foodplants of some Stick-insects (Phasmida = Phasmatodea) from Singapore. *Malayan Nature Journal*, 47(4): 393-396.
- Zompro, O. (2000) Designation of type-species of 13 stick-insect genera described by J. Redtenbacher (Insecta: Orthoptera: Phasmatodea). *Annalen des Naturhistorischen Museums in Wien*, 102B: 93-96.

Note on *Pseudodiacantha macklottii* (de Haan, 1842)

Oliver Zompro, Max-Planck-Institut für Limnologie, AG Tropenökologie, August-Thienemannstraße 2, 24306 Plön, Germany.

Abstract

The type species of *Lamachus* Stål, 1877, *Lamarchinus* Uvarov, 1940, *Lopaphus* Redtenbacher, 1908 (not *Lopaphus* Westwood, 1859), *Lopaphodes* Karny, 1923, *Orxines* Stål, 1875, *Pseudodiacantha* Redtenbacher are reviewed, with the result that *Lamachus* and *Lamarchinus* are found to be new synonyms of *Orxines* and that the correct name of one of the most famous phasmids has to be corrected into *Pseudodiacantha macklottii* (de Haan, 1842).

Key words

Phasmida, Phasmatodea, *Orxines* Stål, *Lamachus* Stål, *Pseudodiacantha* Redtenbacher, type species, *Pseudodiacantha macklottii* (de Haan, 1842), new synonyms.

The lichen-like phasmid *Orxines macklottii* (de Haan, 1842), is one of the most famous phasmids. During his research on Philippine phasmids the author came across a striking mistake which Rehn (1904: 71) made when selecting a type species for *Orxines* Stål, 1875, caused by ignoring or not understanding Stål's reasons for the establishment of his new genus *Lamachus* Stål, 1877. The selection of *Anophelepis xiphias* Westwood as type species of *Orxines* Stål by Rehn (1904: 71) was founded just on the fact that this species was figured by Westwood.

In *Orxines* its author, Stål, originally included *Anophelepis xiphias* Westwood, 1859: 71, pl. 4.4 & 4.5, *Necroscia zeuxis* Westwood, 1859: 151, pl. 28.5 & 28.6 and *Phasma* (*Lopaphus*) *macklottii* de Haan, 1842: 126, pl. 11.1 & 11.2. When establishing *Lamachus*, Stål (1877: 41) pointed out that the new genus differs from *Orxines* in the body being "longiore et graciliore" (longer and slenderer) and included the newly described *L. semperi* and *L. xiphias* (Westwood). So it was obvious that his intention was to separate the slender, stick-like species from the lichen-like *macklottii* and *zeuxis*.

Redtenbacher (1908: 552) erected *Pseudodiacantha* for *P. obscura*, a species that Brock (1998: 8) found to be a synonym of *O. macklottii* (de Haan, 1842), so this is an available genus to include the species Stål wanted to place in his *Orxines*.

Because of Rehn's decision, *Lamachus* becomes a synonym of *Orxines*, which includes the species *O. xiphias* (Westwood) and *O. semperi* (Stål) and some other species, while *Pseudodiacantha* includes *P. macklottii* (de Haan) and *P. zeuxis* (Westwood); consequently *Lopaphus* Redtenbacher (not *Lopaphus* Westwood) and *Lopaphodes* Karny are synonyms of *Pseudodiacantha*. This means that one of the most famous phasmids from the PSG culture list: PSG 2, *Orxines macklottii*, has to change its name into *Pseudodiacantha macklottii* (de Haan, 1842).

The synonymies of *Orxines* and *Pseudodiacantha* are as follows:

Orxines Stål, 1875: 43. Type species: *Anophelepis xiphias* Westwood, 1859: 71, pl. 4.4 & 4.5, by subsequent designation of Rehn, 1904: 71.

Lamachus Stål, 1877: 41, n.syn. Type species: *Lamachus semperi* Stål, 1877, by present designation. Preoccupied by *Lamachus* Foerster, 1868 (Hymenoptera: Ichneumonidae).

Lamarchinus Uvarov, 1940: 175, n.syn. Type species: *Lamachus semperi* Stål, 1877, by indication. Replacement name for the preoccupied *Lamachus* Stål, 1877.

Pseudodiacantha Redtenbacher, 1908: 552. Type species: *Pseudodiacantha obscura* Redtenbacher, 1908: 552, by monotypy; a synonym of *O. macklottii* (de Haan, 1842), synonymised by Brock, 1998: 8.

Lopaphus Redtenbacher, 1908: 491. Type species: *Necroscia zeuxis* Westwood, 1859, by

monotypy. Preoccupied by *Lopaphus* Westwood, 1859: 99 (Phasmatodea), replaced by *Lopaphodes* Karny, 1923: 241.

Lopaphodes Karny, 1923: 241 (Replacement name for *Lopaphus* Redtenbacher (not *Lopaphus* Westwood). Type species: *Necroscia zeuxis* Westwood, 1859: 151, pl. 28.5 & 28.6, by original designation. Synonymised erroneously with *Orxines* Stål by Günther, 1934: 530.

References

- Brock, P.D. (1998) List of type specimens of stick-insects in the Zoölogisch Museum, Universiteit van Amsterdam. *Phasmid Studies*, 7(1): 6-10.
- Haan, W.de. (1842) Bijdragen tot de kennis der Orthoptera. In: Temminck, C.J.: *Verhandelingen Zoologie* vol. 2: 95-138.
- Karny, H.H. (1923) Zur Nomenklatur der Phasmoiden. *Treubia*, 3(2): 230-242.
- Redtenbacher, J. (1908) *Die Insektenfamilie der Phasmiden. III. Phasmidae Anareolatae (Phibalosomini, Acrophyllini, Necrosciini)*. Leipzig.
- Rehn, J.A.G. (1904) Studies in the Orthopterous family Phasmidae. *Proceedings of the Academy of Natural Sciences, Philadelphia*, 56: 38-107.
- Stål, C. (1875) Recensio Orthopterorum. Revue critique des Orthoptères décrits par Linné, de Geer et Thunberg. P.A. Norstedt & Söner, Stockholm.
- Stål, C. (1877) Orthoptera nova ex insulis Philippinis. *Öfversigt af Kongliga Vetenskaps-Akademiens Handlingar*, 10: 33-58.
- Uvarov, B.P. (1940) Twenty eight new generic names in Orthoptera. *Annals and Magazine of Natural History*, (11)5: 173-176.
- Westwood, J.O. (1859) *Catalogue of the Orthopterous insects in the collection of the British Museum. Part I. Phasmidae*. British Museum, London.

A new species of *Phanocles* from Ecuador (Phasmatodea: Diapheromeridae: Diapheromerinae: Diapheromerini)

Oliver Zompro, Max-Planck-Institut für Limnologie, AG Tropenökologie, August-Thienemannstraße 2, 24306 Plön, Germany.

Abstract

A new species of *Phanocles* Stål, 1875, *P. decorus* n.sp. from Ecuador, is described from the collection of the Zoologisches Museum der Humboldt-Universität in Berlin, Germany.

Key words

Phasmida, Phasmatodea, *Phanocles decorus* n.sp., Ecuador.

Introduction

While examining material of Phasmatodea: Diapheromeridae in the Zoologisches Museum der Humboldt-Universität in Berlin, Germany, the author's attention was drawn to a species of *Phanocles* Stål, 1875, with striking morphology of the mesothorax and meso- and metafemora. Further research proved that it is a species new to science.

Phanocles decorus n.sp.

Holotype: Female, 71; Ecuador (Zoologisches Museum der Humboldt-Universität, Berlin). [The 71 appears to be a number used when the specimen was loaned to Brunner.]

Diagnosis

A typical *Phanocles* species, differing from the others by the spination of the mesothorax and the spinose lobes on the ventral carinae of meso- and metafemora.

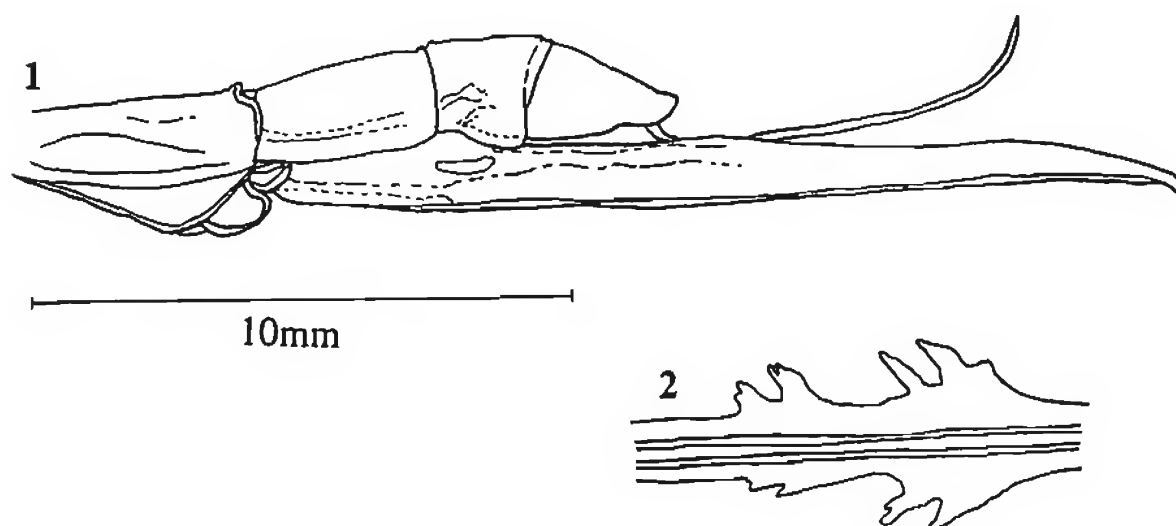
Description (Figs. 1-2)

The specimen was reset by the author to reduce the risk of further damage, a colour print of the original setting is included with the specimen. The type shows some damage caused by anthrenids. Left protibiae and right foreleg missing in the only specimen. Left midleg regenerated.

Average sized member of *Phanocles*, general colour brown in the preserved specimen. Head oval, vertex raised with two prominent spines behind eyes; with two small tubercles and a transverse impression before them. Eyes projecting hemispherically, between them is another small tubercle. Scapus flat, rectangular, anteriorly thickened, laterally with broad margins. Pedicellus two thirds as wide and half as long as scapus, cylindrical. Following segments elongated. Antennae reaching back beyond median segment.

Prothorax rectangular, narrower and shorter than head, granulose, with distinct anterior and lateral margin, median line and deep mediotransverse impression, and a small tubercle posteromedially. Mesothorax strongly elongate, almost six times as long as prothorax, each side with a row of three large spines submedially and a row of several smaller spines or tubercles laterally. Mesonotum tectiform, mesosternum tuberculate. Metathorax short, neither tuberculate nor spinose.

Profemora strongly compressed basally, triangular in cross-section, with a very prominent dorsal carina, two smaller interior carinae and an indistinct ventral one. Mesofemora trapezoidal in cross-section, with distinct dorsolateral and ventrolateral carinae, ventrolateral carinae produced as large spines apically. Ventrolateral carinae bearing large, spinose lobes (Fig. 2), which show a gap in their middle. Some of the spines have more than one apex. Mesotibiae also trapezoidal in cross-section, the anterior third with a rounded lobe



Figures 1-2. *Phanocles decorus*, female; 1. Apex of abdomen, lateral view.
2. Left metafemora, dorsal view.

on the ventrolateral carinae; dorsal carinae diverging apically. Mesobasitarsus with prominent triangular crest, as long as following three tarsites combined, these also carinate. Second tarsite twice as long as third, fourth half as long as third. Terminal segment curved, as long as first tarsite. Hindlegs as midlegs, but metabasitarsus longer than following three segments combined.

Median segment longer than metanotum. Abdominal segment II as long as median segment, II to V increasingly longer, VI to VII shorter and narrower. Sternum of II with four spines, VII with praeopercular organ. Lateral margins of abdominal segments II to VIII with a pair of parallel ridges. VIII half as long and narrower than VII. X shorter, but longer than IX. Posterior margin of X roundly, posterior half tectiform dorsally. Cerci short, straight, simple. Subgenital plate projecting X almost by length of VII to X combined, with median carina ventrally, apex acute. Genital valves almost as long as projecting part of subgenital plate (Fig. 1).

Measurements (mm): Body: 171.0; head: 9.2; prothorax: 6.5; mesothorax: 36.1; metathorax: 9.7; median segment: 12.1; subgenital plate: 28.9; antennae: 76.0; profemora: 38.9; protibiae: ?; mesofemora: 26.8; mesotibiae: 31.3; metafemora: 29.8; metatibiae: 41.6.

Etymology

From the Latin "*decorus*", drawing attention to the spines on the meso- and metafemora and the spination of the thorax, which divides it from the other species of *Phanocles*.

References

- Stål, C. (1875) *Recensio Orthopterorum. Revue critique des Orthoptères décrits par Linné, de Geer et Thunberg*. P.A. Norstedt & Söner, Stockholm.
- Zompro, O. (2001) A generic revision of the insect order Phasmatodea: The New World genera of the stick insect subfamily Diapheromeridae: Diapheromerinae = Heteronemiidae: Heteronemiinae sensu Bradley & Galil, 1977. *Revue suisse de Zoologie*, 108(1): 1-67.

A review of Eurycanthinae: Eurycanthini, with a key to genera, notes on the subfamily and designation of type species

Oliver Zompro, Max-Planck-Institut für Limnologie, AG Tropenökologie, August-Thienemannstraße 2, 24306 Plön, Germany.

Abstract

The genera of Eurycanthinae are a clearly separated group because of the morphology of their genitalia and eggs. The genus *Cnipsus* Redtenbacher, 1908, is possibly a member of Xeroderinae. A key is provided to the genera, and a list with their synonymy included.

A new genus, *Erinaceophasma*, is erected for *Promachus vepres* Brunner von Wattenwyl, 1907, and related species. Three type species of genera are designated: *Trapezaspis kaiman* Redtenbacher, 1908, for *Trapezaspis* Redtenbacher, 1908; *Eupromachus acutangulus* Brunner von Wattenwyl, 1907, for *Eupromachus* Brunner von Wattenwyl, 1907; and *Acanthoderus rachis* Saussure, 1868, for *Cnipsus* Redtenbacher, 1908.

Key words

Phasmida, Phasmatodea, Eurycanthinae, Eurycanthini, *Erinaceophasma* n.gen., genera, type species, synonymy, key.

Introduction

During research into phasmids from New Guinea in the Zoologisches Museum der Humboldt-Universität zu Berlin (ZMHB) the author examined several species of *Neopromachus* Giglio-Tos, 1912. The Museum material includes by far the most important collection of New Guinea phasmids in existence, and most of the species of this genus are present.

It became obvious that *Neopromachus* clearly consists of two groups: species with basally curved profemora, and species with basally straight profemora. Further examination showed that the straight profemora are characteristic for the genera closer related to *Eurycantha* Boisduval, 1835. As no intermediate morphology of the profemora is found in any species, generic rank seems justified.

Günther (1929) removed several species from *Neopromachus*, mostly those from mainland Asia, and stressed that dividing the remaining species in several genera could be necessary (1929: 715). Particularly for *Neopromachus vepres* Brunner von Wattenwyl, 1907, he recommended the erection of a new genus (1929: 717). Nevertheless, he based his statements on characteristics in the spination only and did not once, even in his keys, draw attention to the morphology of the profemora. This is unsatisfactory as culturing of phasmids has shown in many cases that the spination is quite variable. Günther accepted *Neopromachus* as a member of Lonchodinae, but supposed a close relation to the Eurycanthinae (1953: 561).

Eurycanthinae

Several of the genera included in the Eurycanthinae by Günther (1953: 555-556) are of unclear systematic position. In this paper only genera with the typical female ovipositing apparatus consisting of an elongate supraanal plate, which is always projecting beyond an also elongate subgenital plate and a bullet-shaped egg with cordiform micropylar plate and a round, flat operculum lacking a capitulum are accepted as Eurycanthinae.

The genus *Cnipsus* Redtenbacher, 1908: 350, included by Günther (1953: 556), does not agree with these characters and is possibly a member of Xeroderinae. Its type species is *Acanthoderus rachis* Saussure, 1868: 64, by present designation.

The Eurycanthini show a clear line in development to more specialized forms. The most primitive member seems to be *Brachyrtacus*, which looks like a member of related phasmids with a stick-like body, but exhibits the same morphology of the genitalia. *Eupromachus*, *Asprenas* and *Neopromachus* have curved profemora and a rough sternum, this is present in *Erinaceophasma* and *Oreophasma* also, but the profemora are straight. The

straight profemora are a character common to the remaining genera, which agree in their smooth sternal segments. The males of most species of the genera *Canachus*, *Eurycantha*, *Thaumato bactron* and *Dryococelus* have broadened and often strongly spinose metafemora. In *Thaumato bactron* and *Dryococelus* the ovipositing apparatus of the females is secondarily reduced, members of these genera have a strikingly shiny body.

Erinaceophasma n.gen.

Type species: *Promachus vepres* Brunner von Wattenwyl, 1907: 298, pl. 13.6a & 13.6b, by present designation. Lectotype designated by Brock, 1998: 64. Egg described and figured by Zompro, 1997: 2.

Diagnosis

Erinaceophasma n.gen. is very similar to *Neopromachus* Giglio-Tos, 1912, but differs in the straight profemora.

Description

Body with prominent spines. Head rounded rectangular, vertex slightly raised, spinose. Eyes projecting hemispherically. Scapus rounded rectangular, slightly flattened, pedicellus half as long and two thirds as wide. Antennae projecting (laid back) beyond abdominal segment III, consisting of more than 26 elongate segments.

Prothorax subquadrate, with deep mediotransverse impression, spinose. Mesothorax subtrapezoidal, lateral margins slightly concave (male) or convex (female), more than three times as long as prothorax. Metathorax subquadrate to transverse, slightly longer than prothorax.

Profemora straight, basally not curved, subquadrate to trapezoidal in cross-section, ventral and dorsal carinae serrated. Protibiae longer than profemora, quadrate in cross-section, edges only slightly serrated. Probasitarsi as long as following four tarsites without claws combined, carinate dorsally. Second tarsite longer than third, third longer than fourth, terminal segment as long as previous three combined. Meso- and metafemora trapezoidal in cross-section, ventral and dorsal carinae serrated, meso- and metatibiae considerably longer than femora, quadrate in cross-section, edges serrated. First to fourth tarsite carinated. Meso- and metabasitarsi slightly shorter than following four segments combined. Second tarsite longer than third one, twice as long as fourth, fifth segment as long as previous three segments combined.

Median segment as long as metathorax, transverse. Abdominal segments II to VII in male slightly longer than wide, of similar length; in female also of similar length, transverse, II to IV increasingly broader, IV widest segment, V to VII narrowed. In male VIII longer than IX, X longer than IX. IX wider than VIII and X, X wider than VIII, medially divided by half of its length. Subgenital plate short, only slightly projecting beyond IX. In female VIII as long as IX, but wider, X narrower than IX, fused with supraanal plate, the latter strongly elongate, carinate dorso medially and acute at its apex. Subgenital plate strongly elongate, but always shorter than supraanal plate. Cerci in both sexes very short and slender.

Egg typical for Eurycanthinae, bullet-like, capsule irregularly carinated, micropylar plate cordiform, operculum round, flat, capitulum absent.

Etymology

Erinaceophasma is taken from the scientific name of the hedgehog, drawing attention to the strong spination.

Genera of Eurycanthini :

- Asprenas* Stål, 1875: 45. Type species: *Asprenas femoratus* Stål, 1875: 89, by monotypy.
 = *Acanthodyta* Sharp, 1898: 85. Type species: *Acanthodyta spiniventris* Sharp, 1898: 86, pl. 8.11, by monotypy, synonymised by Redtenbacher, 1908: 349.
- = *Neanthes* Stål, 1875: 45. Type species: *Neanthes brunneri* Stål 1875: 90, by monotypy, synonymised by Kirby, 1904: 367; preoccupied by *Neanthes* Kinberg, 1865 (Vermes).
- Brachyrtacus* Sharp, 1898: 84. Type species: *Brachyrtacus celatus* Sharp, 1898: 84, by monotypy.
- Canachus* Stål, 1875: 47. Type species: *Canachus crocodilus* Stål, 1875: 90, by subsequent designation of Kirby, 1904: 396.
- Carlius* Uvarov, 1939: 458. Type species: *Brachyrhamphus fecundus* Carl, 1915: 189, by indication; replacement name for *Brachyrhamphus* Carl, 1915: 175, 188. Type species: *Brachyrhamphus fecundus* Carl, 1915: 189, by subsequent designation of Hennemann & Conle, 1999: 9; preoccupied by *Brachyrhamphus* Bertoni, 1901 (Aves), and *Brachyrhamphus* Brandt, 1837 (Aves).
- Dryococelus* Gurney, 1947: 384. Type species: *Karabidion australe* Montrouzier, 1855: 81, by original designation.
- Erinaceophasma* Zompro n.gen. Type species: *Promachus vepres* Brunner von Wattenwyl, 1907: 298, pl. 13.6a & 13.b, by original designation.
- Eupromachus* Brunner von Wattenwyl, 1907: 300. Type species: *Eupromachus acutangulus* Brunner von Wattenwyl, 1907: 300, by present designation.
- Eurycantha* Boisduval, 1835: 647. Type species: *Eurycantha horrida* Boisduval, 1835: 647, by monotypy.
- = *Karabidion* Montrouzier, 1855: 82; unnecessary replacement name for *Eurycantha* Boisduval. Type species: *Eurycantha horrida* Boisduval, 1835: 647, by indication.
- Labidiophasma* Carl, 1915: 174, 186. Type species: *Labidiophasma rouxi* Carl, 1915: 187, by monotypy.
- Microcanachus* Donskoff, 1988: 56. Type species: *Microcanachus matileorum* Donskoff 1988: 57, by original designation.
- Neopromachus* Giglio-Tos, 1912: 94. Type species: *Acanthoderus wallacei* Westwood, 1859: 181, pl. 40.7 & 40.8, by indication; replacement name for *Promachus* Stål, 1875: 17. Type species: *Acanthoderus wallacei* Westwood, 1859: 181, pl. 40.7 & 40.8, by subsequent designation of Kirby, 1904: 326; preoccupied by *Promachus* Loew, 1848 (Diptera); *Promachus* Cresson, 1887 (Hymenoptera) is another junior homonym.
- = *Giglotosea* Aulmann, 1918: 47. Type species: *Acanthoderus wallacei* Westwood, 1859: 181, pl. 40.7 & 40.8, by indication; unnecessary replacement name for the preoccupied *Promachus* Stål, 1875.
- Oreophasma* Günther, 1929: 659. Type species: *Oreophasma polyacanthum* Günther, 1929: 659, by original designation.
- Paracanachus* Carl, 1915: 174, 181. Type species: *Canachus circe* Redtenbacher, 1908: 347, by original designation.
- Symetriophasma* Hennemann, 1996: 457. Type species: *Symetriophasma brevitarsa* Hennemann 1996: 459, fig. 1-5, by original designation.
- Thaumatolectron* Günther, 1929: 663. Type species: *Thaumatolectron poecilosoma* Günther, 1929: 663, pl. 7.1 & 7.2, by original designation.
- = *Poecilobactron* Günther, 1953: 556, misspelling of *Thaumatolectron* Günther, 1929.
- Trapezaspis* Redtenbacher, 1908: 348. Type species: *Trapezaspis kaiman* Redtenbacher, 1908: 348, pl. 16.5, by present designation.

Key to the genera of Eurycanthinae

1. Profemora basally curved. 2
- Profemora straight. 5
2. Dorsal surface of body, pro-, meso- and metasternum smooth or carinate, not armed. *Brachyrtacus*
- Pro-, meso- and metasternum at least slightly granulated, never smooth or carinate, dorsal surface of body spinose or tuberculate. 3
3. Pro-, meso- and metasternum carinate. *Eupromachus*
- Pro-, meso- and metasternum not carinate, body spinose. 4
4. Very elongate, winged. *Asprenas*
- More compact, apterous. *Neopromachus*
5. Pro-, meso- and metasternum rough, tuberculate or spinose. 6
- Pro-, meso- and metasternum smooth. 8
6. Antennae not longer than head and thorax, consisting of about 21 segments.
- *Oreophasma*
- Antennae considerably longer than head and thorax. 7
7. Pronotum subquadrate. *Erinaceophasma*
- Pronotum trapezoidal. *Paracanachus*
8. Mesothorax broadest anteriorly, or with posterolateral edges projecting. 9
- Mesothorax narrower anteriorly than posteriorly. 12
9. Mesothorax trapezoidal, broadest anteriorly. *Trapezaspis*
- Mesothorax subquadrate to rectangular. 10
10. Abdomen broadest in the anterior segments. *Labidiophasma*
- Abdomen broadest in the middle. 11
11. Body strongly spinose. *Symetriophasma*
- Body unarmed. *Microcanachus*
12. Abdomen spinose laterally. 13
- Abdomen not armed, smooth. 14
13. Rudiments of tegmina present. *Canachus*
- Rudiments of tegmina absent. *Eurycantha*
14. Edges of femora and tibiae distinctly keeled. *Thaumato bactron*
- Femora and tibiae almost cylindrical, edges indistinctly keeled. *Dryococelus*

References

- Aulmann, G. (1918) Neuer Phasmiden-Gattungsname. *Entomologische Rundschau, Stuttgart*, 35: 47.
- Boisduval, J.A. (1835) *Voyage de découvertes de l'Astrolabe. Exécuté par ordre du Roi, pendant les années 1826-1827-1828-1829, sous le commandement de M. J. Dumont d'Urville. Faune Entomologique de l'Océan Pacifique, avec l'illustration des Insectes nouveaux recuëllies pendant le voyage.* J. Tastu, Paris. i-vii, 647-650, pl. 2.
- Brock, P.D. (1998) Catalogue of type specimens of Stick- and Leaf-Insects in the Naturhistorisches Museum Wien (Insecta: Phasmida). *Kataloge der wissenschaftlichen Sammlungen des Naturhistorischen Museums in Wien*, 13(5): 1-72.
- Brunner von Wattenwyl, C. (1907) *Die Insektenfamilie der Phasmiden. II. Phasmidae Anareolatae (Clitumnini, Lonchodini, Bacunculini).* Leipzig.
- Carl, J. (1915) Phasmiden von Neu-Caledonien und den Loyalty-Inseln. In: Sarasin, F. & Roux, J.: *Forschungen in Neu-Caledonia. Zoologie*, (2)2(9): 173-194.
- Donskoff, M. (1988) Phasmatodea de Nouvelle-Caledonie. 1. Nouvelles signalisations et description de *Microcanachus* n. gen. In: Tillier, S. (ed.), *Zoologia Neocaledonica, I. Mémoires, Museum national d'Histoire naturelle, Paris*, (A)142: 53-60, fig. 1-13.

- Giglio-Tos, E. (1912) Specie nuove di Fasmidi raccolti dal Prof. L. Schultze nella Nuova Guinea. *Entomologische Rundschau, Stuttgart*, 29(8): 93-94.
- Günther, K. (1929) Die Phasmoiden der Deutschen Kaiserin Augusta-Fluss-Expedition 1912/13. Ein Beitrag zur Kenntnis der Phasmoidenfauna Neuguineas. *Mitteilungen aus dem Zoologischen Museum, Berlin*, 14: 600-747, pl. 1-7.
- Günther, K. (1953) Über die taxonomische Gliederung und die geographische Verbreitung der Insektenordnung der Phasmatodea. *Beiträge zur Entomologie, Berlin*, 3: 541-563.
- Gurney, A.B. (1947) Notes on some remarkable Australasian walkingsticks, including a synopsis of the genus *Extatosoma* (Orthoptera: Phasmatidae). *Annals of the Entomological Society of America*, 40: 373-396.
- Hennemann, F.H. & Conle, O.V. (1996) *Symetriophasma brevitarsa* n.gen., n.sp. - eine neue Phasmidae aus Neuguinea (Phasmatodea: Eurycanthinae). *Entomologische Zeitschrift*, 106(11): 457-460.
- Hennemann, F.H. & Conle, O.V. (1999) Typenmaterial im Naturhistorischen Museum Basel. *Entomologica Basiliensia*, 21: 5-12.
- Kirby, W.F. (1904) *A synonymic catalogue of Orthoptera. 1. Orthoptera Euplexoptera, Cursoria et Gressoria. (Forficulidae, Hemimeridae, Blattidae, Mantidae, Phasmatidae)*. British Museum, London.
- Montrouzier, P. (1855) Essai sur la faune de l'île de Woodlark ou Moïou. *Annales de la Société d'agriculture de Lyon*, (2)7: 1-5, 79-90.
- Redtenbacher, J. (1908) *Die Insektenfamilie der Phasmiden. III. Phasmidae Anareolatae (Phibalosomini, Acrophyllini, Necrosiini)*. Leipzig.
- Saussure, H.de (1868) Phasmidarum novarum species nonnullae. *Revue et Magazine de Zoologie*, (2)20: 63-70.
- Sharp, D. (1898) *Account of the Phasmidae, with notes on the eggs*. In: Willey, A.: *Zoological Results 2*. Cambridge University Press, pp. 75-94, pl. 7-9.
- Stål, C. (1875) *Recensio Orthopterorum. Revue critique des Orthoptères décrits par Linné, de Geer et Thunberg*. P.A. Norstedt & Söner, Stockholm.
- Uvarov, B.P. (1939) Twenty-four new generic names in Orthoptera. *Annals and Magazine of Natural History, London*, (11)3: 457-459.
- Westwood, J.O. (1859) *Catalogue of the Orthopterous Insects in the collection of the British Museum*. British Museum, London.
- Zompro, O. (1997) Beschreibung der Eier einiger Phasmatodea. *Arthropoda* 5(4): 1-3.

Reviews and Abstracts.

Book Review

A complete guide to breeding stick and leaf insects by Paul D. Brock (2000). Published by TFH Publications. Hardback, 180mm x 220mm, 64 pages, 83 colour illustrations. Price £12.95. ISBN 1 85279 124 1. — Reviewed by Phil Bragg.

Yet another book on rearing phasmids! This one, however, has some pleasing differences in style from most of the others on the market. Unlike some other books from this publisher, the photographs have been produced at a high quality, although there are still a number printed sideways to fit the publisher's conception of how books should be laid-out! The text is refreshingly different, I particularly liked the trivia, "Twelve facts about phasmids" in chapter one, and the trouble shooting section in chapter six. The intervening chapters cover the usual topics: cages, obtaining stock, feeding, breeding etc. A nice break from the usual pattern of such books is to have the morphology near the middle of the book rather than on the first few pages. The last half of the book deals with different species, mainly the brightly coloured or spiny species. Although more expensive than other books on rearing phasmids this one scores heavily for the good quality of production and for style: overall it is probably the best value for money.

Ten year index to *Phasma*

This was issued with *Phasma* volume 10, issue 40 in November 2000. All issues of *Phasma* from issue one in 1991 to issue 40 in 2000 are included. Pages 1-8 give the contents of each issue in chronological order. Pages 9-16 is index to topics and scientific names. In addition to indexing species by scientific name, the species are indexed by PSG number.

Phasmid Abstracts

The following abstracts briefly summarise articles which have recently appeared in other publications. Some of these may be available from local libraries. Others will be available in university or college libraries, many of these libraries allow non-members to use their facilities for reference purposes free of charge.

The editor of *Phasmid Studies* would welcome recent abstracts from authors so that they may be included in forthcoming issues. In the case of publications specialising in phasmids, such as *Phasma*, only the longer papers are summarised.

Blackmore, P. (2000) Feeding stick insects. *Veterinary Invertebrate Society Newsletter*, 2(16): 12-13.

Brief notes on rearing phasmids, with a table of foodplants for some of the commonly reared species.

Bradler, S. (1999) The vomer of *Timema* Scudder, 1895 (Insecta: Phasmatodea) and its significance for phasmatodean phylogeny. *Courier Forschungsinstitut Senckenberg*, 215: 43-47.

As widely accepted the small Nearctic *Timema* Scudder, 1895 is the sister-group of all other Phasmatodea. A male postgenital clasper, the so-called vomer, which is common within the Phasmatodea, is described for the first time for *Timema*. This structure is interpreted as belonging to the phasmatodean ground plan. As the taxon "Phylliidae" sensu

Key (1991) is only founded on the possession of the vomer, it is doubtfully monophyletic, the vomer probably being plesiomorphic for the "Phylliidae". The tibial area apicalis, on which the "Areolatae" (= "Phylliidae" sensu Karny, 1923 [non sensu Key]) have been based, is considered to be plesiomorphic for the "Areolatae" because it already occurs in *Timema*. Therefore the "Areolatae" are likely to be paraphyletic. This assumption is also supported by autapomorphies of a taxon comprising the areolate *Bacillus* Latreille, 1825 and several anareolate taxa. The "Anareolatae" (= "Phasmatidae") form a polyphyletic assemblage. It is hypothesised that the area apicalis was reduced at least twice within the Phasmatodea. The name Euphasmatodea is proposed for the adelphotaxon of *Timema*.

Bühler, M. (1999) *Aretaon asperrimus* (Redtenbacher, 1906) Die Kleine Dornschrecke. *Arthropoda*, 7(4): 5-6. [in German]

Some brief notes on *Aretaon asperrimus* (Redtenbacher).

Cheeseman, V. (2000) Stick insects. *Veterinary Invertebrate Society Newsletter*, 2(16): 17.
A brief introductory guide to rearing phasmids.

Cliquennois, N. & Rabaey, K. (2000) *Myronides trilineatus* Carl, PSG nr 217. *Phasma*, 10(40): 88-89. [in Dutch]

Notes on rearing *Myronides trilineatus* Carl, 1915. This species is in culture as PSG 217. The male, female, and the egg are illustrated.

Conle, O. & Hennemann, F.H. (1999) Bemerkungen zu *Agathemera crassa* (Blanchard, 1851) aus Chile nebst Beschreibung ihrer Eier (Phasmatodea: Pseudophasmatidae). *Entomologische Zeitschrift*, 109(2): 82-85. [in German]

In this paper some notes on the biology and on breeding experiences concerning *Agathemera crassa* (Blanchard, 1851) are made, including a list of alternative foodplants used. Besides the description of the eggs, some notes on the synonymy of this species are given.

D'Hulster, K. & Abercrombie, I. (2001) Gestreepte en gevlekte *Heteropteryx dilatata*'s. *Phasma*, 11(41): 12. [in Dutch]

The first PSG cultures of *Heteropteryx dilatata* (Parkinson) from Tapah Hills produced plain brown nymphs and adult males. Further stocks from other West Malaysian regions produced brown male nymphs with white markings on the abdomen. Sarawak stock has males with a white dorsal stripe. Cultures kept now are a mixture of these colour variations and the offspring sometimes have combinations of white markings and stripes.

Grösser, D. (1999) Bemerkung zu *Phyllium giganteum* Männchen (Phasmatodea: Phylliidae). *Arthropoda*, 7(1): 22, plates 1 & 2. [in German]

Notes and illustrations of the male of *Phyllium giganteum* Hausleithner; two colour photographs and one line drawing.

Hennemann, F.H. (1999) Phasmidensteckbrief Nr. 6, *Lopaphus sphalerus* (Redtenbacher, 1908) (PSG 174). *Arthropoda*, 7(1): 19-20. [in German]

A report on rearing *Lopaphus sphalerus* (Redtenbacher). With illustrations of the male and female.

Hoskisson, P. (2001) Soortbeschrijving *Anisomorpha monstrosa* Hebard, PSG nr. 122. *Phasma*, 11(41): 2-4. [in Dutch]

A translation of the report on breeding *Anisomorpha monstrosa* (Hebard) which

originally appeared in *Phasmid Studies*, 9(1&2): 1-3 in January 2001.

Fritzsche, I. (1999) Ein Beispiel für die artspezifische Differenzierung eines Habitats in den nördlichen Ausläufern des Khao Yai, Thailand, anhand einiger Phasmiden (Phasmatodea). *Entomologische Zeitschrift*, 109(2): 78-81. [in German]

A phasmid habitat in Thailand is described, with notes on the characteristics of its different zonation. Specific observations on phasmids are recorded and the foodplants of some species are listed.

Fritzsche, I. (1999) Freilandbeobachtungen an *Baculum thaili* Hausleithner, 1986 bei einsetzendem Regen (Phasmatodea). *Entomologische Zeitschrift*, 109(2): 88. [in German]

Observations on the behaviour of *Baculum thaili* Hausleithner, 1986 when rainfall is starting.

Fritzsche, I. (1999) Phasmidensteckbrief Nr. 5, *Candaules* spec. Thailand. *Arthropoda*, 7(1): 8. [in German]

A brief note on a species of *Candaules* collected Nakhon Ratchasima Province, Thailand.

Fritzsche, I. (1999) Phasmidenstreckbrief Nr. 7, *Lonchodes brevipes* Gray, 1835. *Arthropoda*, 7(2): 13. [in German]

Brief notes on rearing *Lonchodes brevipes* Gray.

Marchese, S., Angeli, S., Andolfo, A., Scaloni, A., Brandazza, A., Mazza, M., Picimbon, J.F., Leal, W.S. & Pelosi, P. (2000) Soluble proteins from chemosensory organs of *Eurycantha calcarata* (Insects, Phasmatodea). *Insect Biochemistry and Molecular Biology*, 30(11): 1091-1098.

Three related nucleotide sequences, encoding mature proteins of 108-113 amino acids, have been obtained from antennal cDNA of the phasmid *Eurycantha calcarata*. Among these, one is also expressed in the tarsi as demonstrated by N-terminal sequence and mass spectrometric analyses of protein samples isolated from both organs. PCR experiments performed with specific primers, showed that this species is also expressed in the mouth organs and in the cuticle, while the other two are antennal specific. All three isoforms are similar to *Drosophila* OS-D and other proteins reported in several insect orders, but one of them is significantly different from the other two. The best conserved elements are the N-terminal region and the four cysteine residues. Accurate ESMS measurements indicated that all cysteines are involved in two disulphide bonds and ruled out the occurrence of additional post-translational modifications. Polyclonal antibodies, raised against the purified protein, did not react with proteins of the same class expressed in another phasmid species, *Carausius morosus*, and in the orthopteran *Schistocerca gregaria*, nor did antibodies against these proteins recognise those of *E. calcarata*.

Potvin, W. (2000) Soortbeschrijving van *Pseudophasma acanthonota* (Redtenbacher). PSG nr. 189. *Phasma*, 10(40): 81-83. [in Dutch]

Brief descriptions of *Pseudophasma acanthonota* (Redtenbacher) (PSG culture 189) are given. Their defensive behaviour is explained and housing, feeding, care and breeding of this winged species are discussed.

Potvin, W. (2000) Nieuw: een *Asceles*-soort uit Ko Tau, Thailand. *Phasma*, 10(40): 90-91. [in Dutch]

An *Asceles* species from Thailand was introduced into captivity. This species pierces leaves to lay its eggs and feeds on *Hypericum* and *Rhododendron*. Although the first generation was successful, the author failed to breed them for a second generation, the nymphs always died in their first, second, or third instar. The eggs are illustrated with a colour photograph.

Rabaey, K. (2001) *Hypericum* als voedselplant voor wandelende takken. *Phasma*, 11(41): 13-15. [in Dutch]

This article first appeared in January 2001 the *Phasmid Study Group Newsletter*, 85: 7-8. The author suggests *Hypericum* as a very useful foodplant for numerous phasmid species. She has offered *Hypericum* as a supplementary foodplant to her stick insects and several species preferred this plant, hardly eating anything else.

Rabaey, K. & van Herwaarden (2000) Een nieuwe *Sipyloidea*-soort uit Nieuw Guinea. *Phasma*, 10(40): 84-87.

On a collecting trip in Irian Jaya, Indonesia, Heinz van Herwaarden and Oscar van Gorkom found a species of *Sipyloidea* close to the city of Sentani. Eggs of the species were transferred to Europe, and successfully brought into culture by Kristien Rabaey. The species can be cultured at 22-25°C with modest to high humidity and feeds best on *Hypericum* spp. The nymphs are very small and fragile and usually suffer high mortality rates. The male, female, and the egg are illustrated.

[Editor's note: this species has been added to the PSG culture list as PSG 222.]

Schmitz, A. & Perry, S.F. (1999) Stereological determination of tracheal volume and diffusing capacity of the tracheal walls in the stick insect *Carausius morosus* (Phasmatodea, Lonchodidae). *Physiological and Biochemical Zoology*, 72(2): 205-218.

First instars of *Carausius morosus* provide a good model for morphometric evaluation of the diffusing capacity between the tracheal system and haemolymph: air sacs are lacking, tracheoles do not penetrate the organs and muscles, and entire animals can be evaluated electron microscopically without subsampling. The tracheal volume makes up 1.3% of the volume of the whole insect excluding appendages. The authors calculated the lateral diffusing capacity for oxygen and carbon dioxide for five classes of tracheae according to their diameters, from 0.2 µm to 35 µm. The harmonic mean thickness of the tracheal epithelium is lowest in smallest tracheae and increases with increasing tracheal diameter. Although the smallest tracheae make up 70% (O₂) and 60% (CO₂) of the total diffusing capacity, the proximal four classes may also be significant in diffusion of oxygen and particularly of carbon dioxide. The suppression of the development of respiratory pigments in the evolution of terrestrial insects may have increased the relative importance of small tracheal elements for local oxygen consumption.

Zompro, O. (1999) Insekten im Terrarium *Sungaya inexpectata*. *VDA-aktuell*, 99(1): 46-47. [in German]

Notes on rearing *Sungaya inexpectata* Zompro, from the Philippines, with photographs of the female and eggs.

Zompro, O. (2000) Die Stabschrecken *Rhamphosipyloidea gorkomi* und *Lonchodes mindanaense*. *VDA-aktuell*, 2000(1): 53-55. [in German]

Notes on *Rhamphosipyloidea gorkomi* (Hausleithner, 1990) and *Lonchodes mindanaense* (Brunner, 1907), with photographs of the eggs and adult females of both species. *Parahyrtacus gorkomi* Hausleithner is transferred from *Parahyrtacus* Hausleithner, 1990 to *Rhamphosipyloidea* Redtenbacher, 1908.

Zompro, O. & Fritzsche, I. (1999) *Dares ziegleri* n.sp., eine neue Phasmide aus Thailand (Phasmatodea: Heteropteryginae: Obriminae: Datamini). *Arthropoda*, 7(1): 10-12 & plate 3. [in German]

A new species of *Dares* Stål, 1875 (Phasmatodea: Heteropterygidae: Obriminae: Datamini) is described from Thailand. This species is isolated within the genus and differs from the other species of this genus by the morphology of the antennae and the egg. Includes one colour photograph of the female, and line drawings of the female's abdomen and egg.

***Caledoniophasma marshallae*, a new genus and species of Phasmatodea**

Oliver Zompro, Max-Planck-Institut für Limnologie, AG Tropenökologie, August Thienemannstraße 2, 24306 Plön, Germany.

Abstract

A new genus and species of Insecta: Phasmatodea from New Caledonia is described. The taxonomic position of *Caledoniophasma marshallae* n.gen., n.sp. is uncertain, it appears to be closest related to the Eurycanthinae or Xeroderinae, but differs strikingly in the morphology of the genitalia. The type is housed in the Natural History Museum, London (BMNH).

Key words

Phasmida, Phasmatodea, *Caledoniophasma marshallae* n.gen. n.sp., New Caledonia.

Introduction

The Phasmatodea-fauna of New Caledonia is comparably well researched, but even as recently as 1988 a new species and genus of walking stick from this island, *Microcanachus matileorum*, has been described by Donskoff. A close relationship to New Guinea is obvious, as many of the species belong to the Eurycanthinae, which have their main distribution in New Guinea. So it was not too surprising when the author discovered a striking new species also representing a new genus in the collection of the Natural History Museum, London (BMNH). On the first view it looked similar to several members of Heteropterygidae, but it is actually a member of Anareolatae since the tibiae do not exhibit an area apicalis. The actual systematic position is unclear since the genitalia differ considerably from those of the Eurycanthinae (as revised by Zompro (2001)) and Xeroderinae; both appear to be suitable subfamilies for this species.

***Caledoniophasma* n.gen.**

Diagnosis: Medium sized anareolate phasmids of unclear systematic position, possibly related to Eurycanthinae or Xeroderinae, but differing in the morphology of the female's genitalia with the subgenital plate being strikingly flattened and bulbous. The male is unknown.

Female: Head rounded rectangular, flattened dorsoventrally, eyes projecting less than hemispherically. Scapus flat, rectangular; pedicellus one quarter of the scapus length, half as wide, cylindrical. Pronotum trapezoidal, granulated and spinose. Mesonotum more than twice as long as pronotum, median line indistinct. Metanotum shorter than pronotum. Tegmina present, with pointed shoulders. Wings (if present) are hidden by the tegmina. Meso- and metafemora and tibiae trapezoidal in cross-section, serrated ventrally; basitarsi short, slightly longer than second tarsite, this longer than third, first to third tarsite carinate, fourth shorter than third, not carinate, terminal segment as long as second to fourth combined, curved. Median segment as long as pronotum, quadrate. Abdominal segments II to VII of equal length, from II to IV increasingly broadened, V to VII narrower. Margins of II to VIII expanded, flat, each almost measuring half diameter of segments. VIII longer than VII, with broad, rounded lateral margin, IX and X narrower, not margined like previous segments. Cerci short, flat, triangular, not projecting beyond X. Subgenital plate prominent, curved, with strong, median keel, not projecting beyond X.

Etymology: Named after the country of origin, New Caledonia.

The type species is *Caledoniophasma marshallae* n.sp.

Caledoniophasma marshallae n.sp.

Material: Holotype: ♀. Data labels read as follows: Loc. Hovailou R, Date 3.12.11, Sex, Coll. P.D. Montague, New Caledonia Exped.; New Caledonia. P.D. Montague. 1918-87 [BMNH].

Description of female: A striking Phasmid of medium size. General colour different shades of brown. The forelegs, antennae, right midleg and left hindleg are missing.

Head rounded rectangular, flattened dorsoventrally, with a transverse elevation between eyes, both halves of this elevation slightly curved and triangularly raised. Vertex and genae with several small tubercles. Eyes projecting less than hemispherically. Scapus very flat, trapezoidal, anteriorly narrowed, with two flat carinae submedially, and a broad, elevated median line ventrally. Pedicellus one quarter of the scapus length, half as wide, cylindrical.

Pronotum granulose, almost quadrate, slightly dilating posteriorly, with distinct mediotransverse impression. Anterior margin produced, with two prominent spines submedially and a smaller one beside each of them. Behind the latter is a small, deep impression; posterior half of the pronotum with two prominent, submedian spines. Posterior margin flat.

Prosternum with two spines standing close to each other medianly in the anterior half, in the posterior one with two spines.

Mesonotum two times as long as pronotum, almost parallel sided, with distinct median line, granulose, and two prominent spines behind anterior margin submedianly. Two small median tubercles standing slightly before the broad and flat posterior margin. Scale-like tegmina present, from dorsal view almost round, with pointed shoulders, turned downwards exteriorly, tegmina slightly projecting beyond metanotum. Mesosternum granulose, with two rows of three distinct spines submedially.

Metanotum slightly shorter than pronotum, less granulose than mesonotum, largely covered by tegmina. Metaepisternum with prominent spine in the middle, followed by smaller ones posteriorly. Metasternum with some small spines and a deep impression before each coxa.

Mesofemora trapezoidal in cross-section, dorsal and ventral edges with saw-like teeth; dorsally with two small teeth in middle of basal half, a prominent pair in middle and a small pair in middle of apical half; ventrally with several small teeth in basal half, a prominent pair slightly distal of the middle, and another prominent pair slightly before the apex. Mesotibiae triangular in cross-section, serrated ventrally. Tarsites one to three distinctly triangularly carinated dorsally. Mesobasitarsus short, slightly longer than second tarsite, third shorter than second, fourth shorter than third, not carinated. Fifth as long as second to fourth combined, slightly curved, unguis curved, as long as mesobasitarsus, arolium prominent. Metafemora also trapezoidal in cross-section, irregularly serrated. Meta-tibiae and tarsites as in midleg.

Abdomen: Median segment almost quadrate, slightly granulated; the anterior half with prominent, double median line, this indistinct in posterior half. Segments I to VI of similar length, dorsally more or less flat, with obtuse median line. II to IV strongly dilating, V to VI narrowed. Margins of II to VIII projecting, broad, flat, almost measuring half the diameter of abdominal segments. Median segment with two spines posteriorly, II to IV with two pairs of spines, V with one pair anteriorly, VI unarmed. Tergite VIII as long as median segment, with rounded margins, a double median line and an impression exterior of median lines anteriorly. IX slightly shorter and half as wide as VIII, with two elevated tubercles posteromedianly, X as long as VIII and as wide as IX, lateral margins produced as an acute

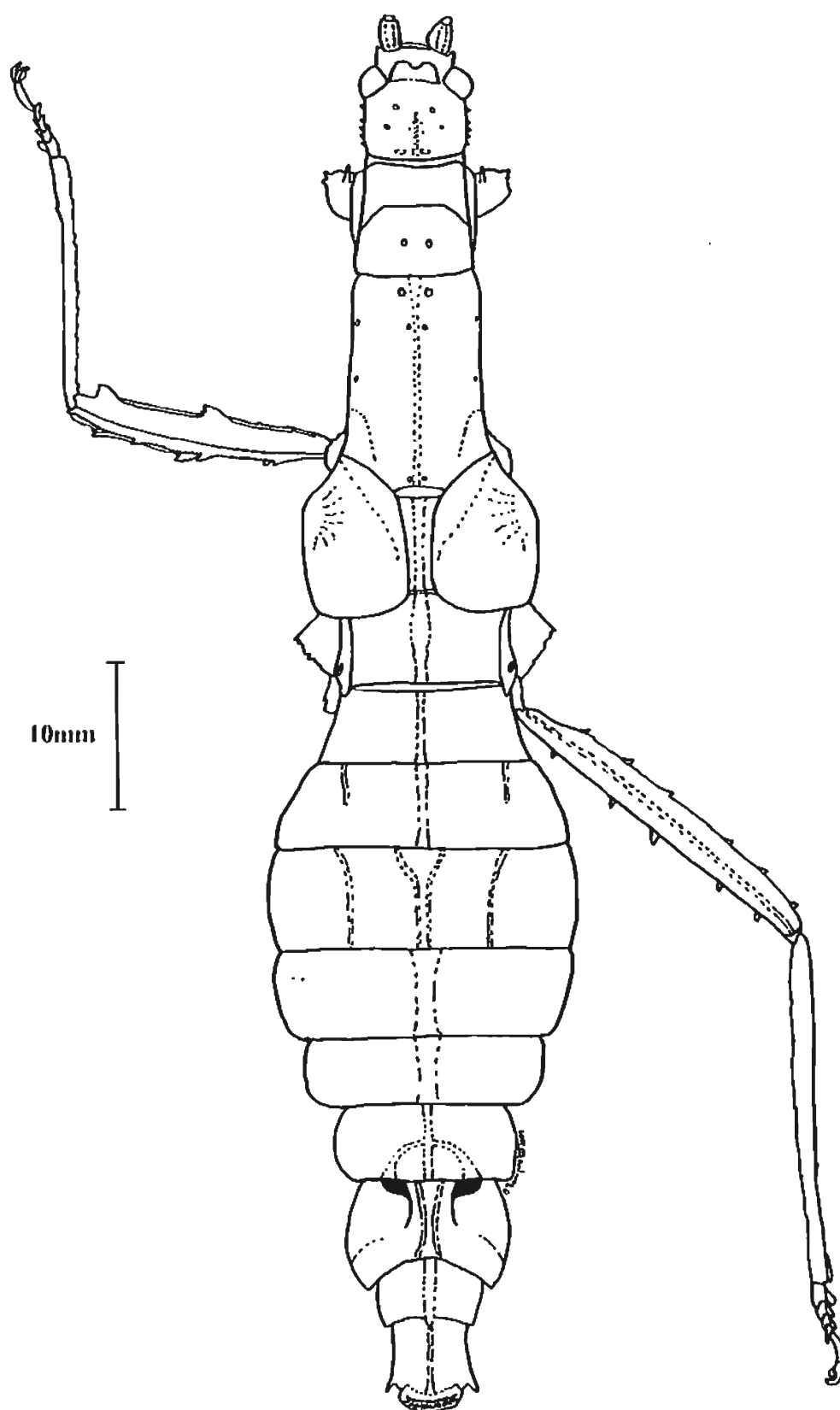


Figure 1. *Caledoniophasma marshallae* n.gen. n.sp., holotype, dorsal view.

triangle, posterior margin laterally with two curved elevations, these covering the short, flat, triangular cerci. Subgenital plate (fig. 2) with a very prominent sharp keel along its whole length, plate strongly curved, but not projecting beyond X.

<i>Caledoniophasma marshallae</i> n.sp. measurements in mm.			
Body length	94.4	Tegmina	8.9
Head	8.1	Wing	?
Pronotum	7.1	Mesofemora	19.2
Mesonotum	16.0	Mesotibiae	16.9
Metanotum	5.5	Metafemora	23.8
Median segment	8.0	Metatibiae	24.9

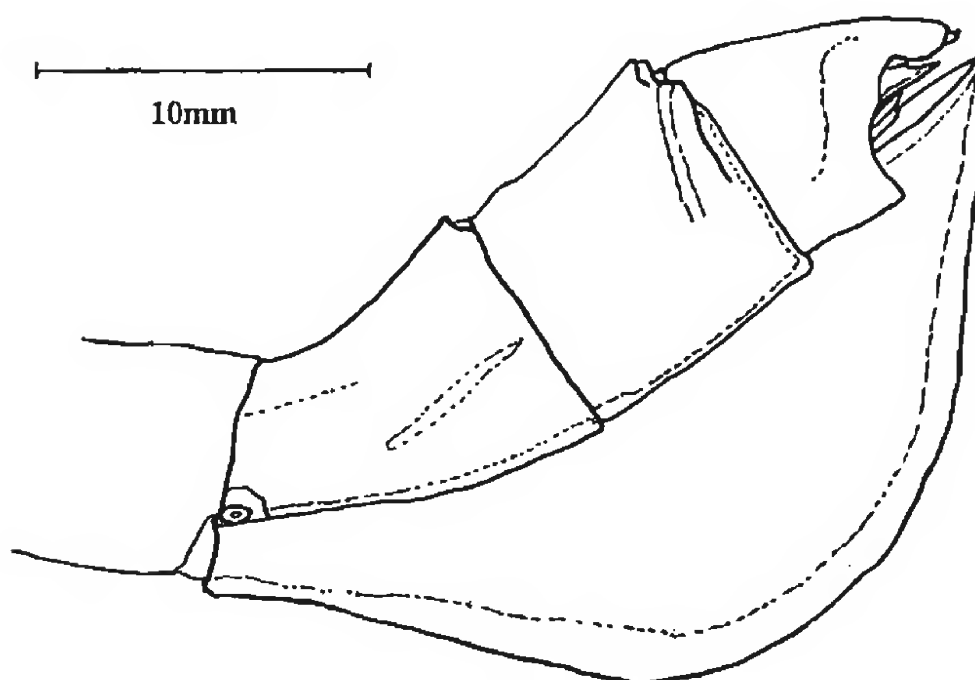


Figure 2. *Caledoniophasma marshallae* n.sp., terminal abdominal segments, lateral view.

Etymology

Dedicated to Mrs. Judith Marshall, British Museum (Natural History), London, England, without whose support the author's visit to the British Museum would have been much less successful.

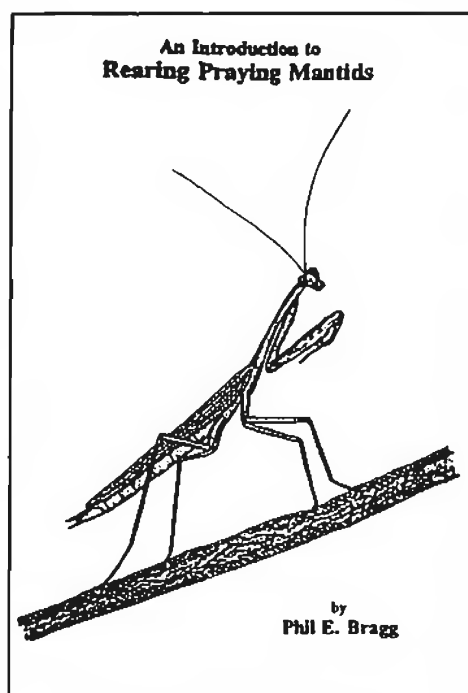
Acknowledgements

The author wants to thank Mr. Ian Abercrombie (Ashford, Kent, England) and the Waddicor family (Swindon, England) for their hospitality, Mrs. Judith Marshall (British Museum, London, England) for a pleasant and successful visit to the British Museum, Mrs. Anke Teschke (Berlin, Germany) and Dr. Phil Bragg for proof-reading the manuscript, and Prof.

Dr. Joachim Adis and Dr. Wolfgang Junk (both Max-Planck-Institute for Limnology, Plön, Germany) for supporting the author's trip to the British Museum.

References

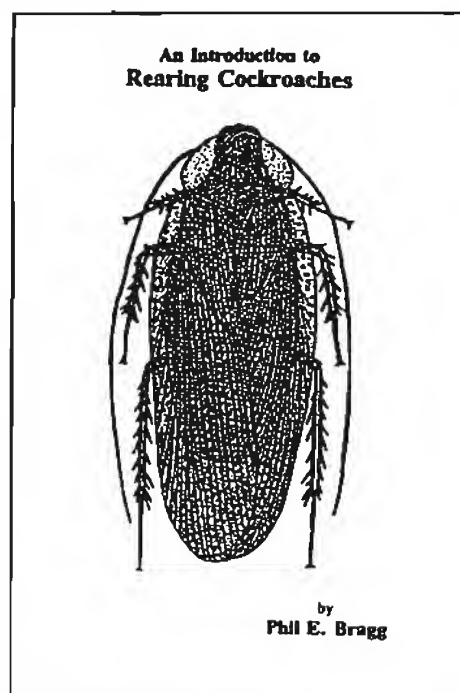
- Donskoff, M. (1988) Phasmatodea de Nouvelle-Caledonie. I. Nouvelles signalisations et description de *Microcanachus* n.gen. In: Tillier, S. [ed.], *Zoologia Neocaledonica*, 1. *Mémoires, Museum national d'Histoire naturelle, Paris* (A)142: 53-60, fig. 1-13.
- Sharp, D. (1898) Account of the Phasmidae, with notes on the eggs. In: Willey, A.: *Zoological Results* 2. *Cambridge University Press*, pp. 75-94, pl. 7-9.
- Zompro, O. (2001) A review of Eurycanthinae: Eurycanthini, with a key to genera, notes on the subfamily and designation of type-species. *Phasmid Studies*, 10(1): 19-23.



An introduction to Rearing Praying Mantids

A5 softback, 16 pages, 10 figs. ISBN 0-9531195-0-5. This book describes methods of rearing and breeding praying mantids. The headings include: An introduction to praying mantids, Types of mantids, Structure of mantids, Mantids in captivity, Cages, Feeding, Breeding, Sexing, Mating, Egg laying, Identification, Preserving mantids, Obtaining mantids, Distributing mantids, and Sources of further information.

The book is illustrated with 10 black and white drawings, plus one on the front cover. The drawings illustrate six different species of mantids, how to distinguish the sexes, details of the fore leg, and an internal view of an egg case.



An introduction to Rearing Cockroaches

A5 softback, 16 pages, 14 figs. ISBN 0-9531195-1-3. This book is intended as a beginners' guide to rearing cockroaches. It is illustrated with 14 black and white drawings, plus one on the front cover. The drawings illustrate eight different species of cockroaches and show how to distinguish the sexes.

There is a general introduction to cockroaches with information on the structure and different types. The commonly available species are grouped according to general type and their suitability for culturing. Cages, feeding, sexing and preserving are all discussed. There are suggestions on obtaining and distributing cockroaches, and there is a list of books offering further information.

Price: £2.50 each. Postage should be added at the following rates: UK 20p, Europe 70p, Elsewhere £1.10.

Orders and payment in pounds sterling should be sent to:

P.E. Bragg, 8 The Lane, Awworth, Nottingham, NG16 2QP, U.K.

More Bornean records of *Necrosia prasina* (Burmeister, 1838)

P.E. Bragg, 8 The Lane, Awsworth, Nottingham, NG16 2QP, UK.

Abstract

Necrosia prasina (Burmeister) is recorded from a number of new localities in Sabah.

Key words

Phasmida, *Necrosia prasina*, Borneo, Sabah, Distribution.

I recently (Bragg, 2001) published records of *Necrosia prasina* (Burmeister, 1838) in Borneo; most of those records were from Sarawak. I have recently returned from a visit to Sabah during which I collected more material and recorded data from the collection of the Forest Research Centre at Sepilok (FRCS). Since the only previous records from Sabah were for Kinabalu National Park and Babaggon, the new records below add significantly to the known distribution of this species.

Material

SABAH.

Ranau, Marakau.

2♀♀, 4♂♂ (FRCS) Entomology Staff, January 1994.

Tawai Forest Reserve (near Telupid).

♀ (FRCS) Entomology Staff, 1-13.ix.1994.

♀ (FRCS) Entomology Staff, June-July 1994.

Sandakan, Kolapis A.

♀ (FRCS) Arthur Chung, 16.iv.1994.

Sepilok.

♀ (FRCS) Jafar & Abdullah, 7.ii.1978.

♂ (FRCS) S.C., C.L.C, A. Chung, 17.vi.1994.

Sepilok Research Centre.

♀ (FRCS) Jafar, 2.xi.1977.

♂ (FRCS) P.E. Bragg & M.L.T. Bushell, 6.viii.2001.

Sepilok Forest Reserve, Orang Utan Centre. N005° 51' 37" E117° 56' 31", altitude 50m.

♂ (PEB-3104) 6.viii.2001.

Kinabalu National Park, Silau Silau Trail. N006° 00' 08" E116° 32' 48", altitude 1592m.

♂ (PEB-3170) P.E. Bragg, 15.viii.2001.

Kinabalu National Park, on window of hostel.

♀ (PEB-3188) P.E. Bragg, 16.viii.2001.

Tenompok Forest Reserve. N006° 00' 58" E116° 30' 18", altitude 1356m.

♂ (M. Bushell) M. Bushell, 12.viii.2001.

Near Babaggon. N005° 54' 22" E116° 10' 16", altitude 96m.

♀ (PEB-3082), ♂ (PEB-3083) P.E. Bragg, 31.vii.2001.

Near Moyog. N005° 52' 38" E116° 14' 23", altitude 419m.

♂ (PEB-3090) P.E. Bragg, 31.vii.2001.

The specimen (PEB-3188) found on the window of the hostel in the morning had presumably been attracted by lights during the night. Latitude, longitude and altitude measurements were made at one point of each collecting area or trail using a hand-held GPS unit; values of latitude and longitude have been rounded off to the nearest second.

Acknowledgements

My thanks go to FRCS staff for providing access to the collection, and to Mark Bushell for assisting with the recording of data.

References

Bragg, P.E. (2001) *Necrosia prasina* (Burmeister), a common red-winged phasmid in Borneo. *Phasmid Studies*, 10(1): 6-14.

***Menexenus exiguus alienigena* Günther, 1939 from Sulawesi**

P.E. Bragg, 8 The Lane, Awwsworth, Nottingham, NG16 2QP, UK.

Abstract

The Royal Entomological Society expedition to Sulawesi in 1985 collected a number of phasmids. One of these was reared in captivity for several generations. This species has recently been identified as *Menexenus exiguus alienigena* Günther, 1939. The adults and eggs are described and illustrated, the female and eggs were previously undescribed.

Key words

Phasmida, Sulawesi, Royal Entomological Society expedition, *Menexenus exiguus alienigena*.

Introduction

In 1985 the Royal Entomological Society of London (RESL) organised a year-long expedition to Sulawesi under the title "Project Wallace". The expedition was based at Dumoga-Bone National Park in Sulawesi Utara (North Sulawesi). Jonathan Cocking was a member of the expedition and collected a number of phasmids, one of these species was successfully reared in the UK and was designated as PSG 92 on the Phasmid Study Group's culture list. In addition to those collected by Jonathan Cocking, quite a few preserved specimens of phasmids were collected by expedition member R.K. Butlin. The descriptions below are based on reared material and the specimens collected by Cocking and Butlin. The standard abbreviations of Arnett *et al* (1993) are used for museums.

***Menexenus exiguus alienigena* Günther, 1939**

Menexenus exiguus alienigena Günther, 1939: 73, fig 12(♂). Holotype ♂ (NHMB), Paratype ♂ (SMTD), North Sulawesi, Minahassa, Gunung Lokon & Tomohon.

Günther described *Menexenus exiguus*, with two subspecies, in the same paper: *M. e. exiguus* and *M. e. alienigena*. They differ mainly by the position of the spines on the mesonotum, those of *alienigena* are in the middle of the mesonotum, those of *exiguus exiguus* are positioned closer to the posterior of the segment. The material described here was compared with specimens of *exiguus exiguus* during a brief visit to Dresden (SMTD) in May 2001; the paratype specimen of *alienigena* was overlooked and not examined. I have since examined photographs of both the holotype and paratype. Günther's paper listed two specimens but did not specify a holotype and paratype; however, the specimens are clearly labelled as such, apparently by Günther. The material from the Project Wallace Expedition will be divided between the Natural History Museum, London (BMNH) and the Museum Zoologicum Bogoriense, Bogor (MBBJ).

Material examined

Sulawesi Utara, Dumoga-Bone National Park, Poniki summit.

5♀♀ (BMNH/MBBJ) R.K. Butlin, 1985.

Sulawesi Utara, Dumoga-Bone National Park, BM plot C.

5♂, 4♀♀ (BMNH/MBBJ) R.K. Butlin, 1985.

Sulawesi Utara, Dumoga-Bone National Park, Muajat 900m.

♀ (BMNH/MBBJ) J. Cocking, 1985.

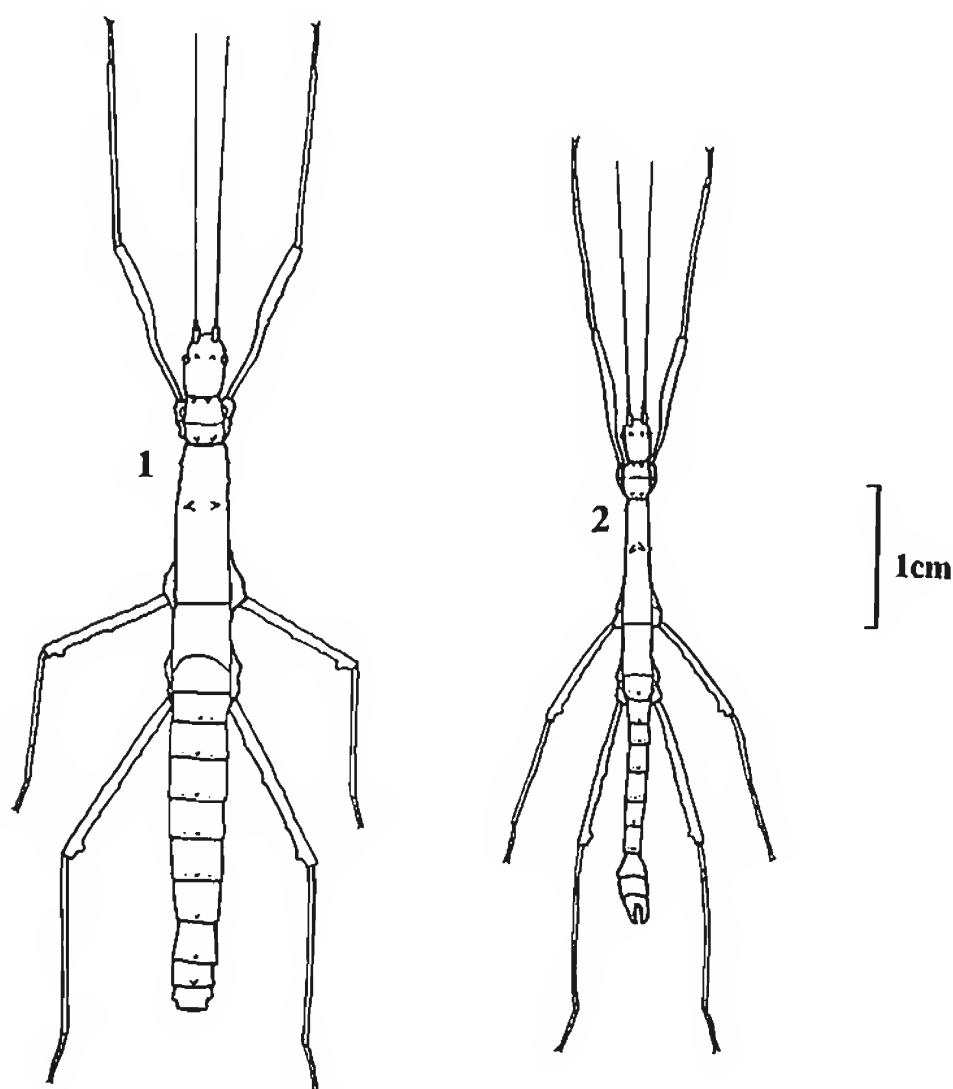
Sulawesi Utara, Dumoga-Bone National Park, Captive reared in U.K.

3♀♀ (PEB-538; PEB-541; PEB-542), 2♂♂ (PEB-539; PEB-540) eggs (PEB-543; PEB-544) P.E. Bragg, 1989.

eggs (PEB-2110) P.E. Bragg, 1990.

1st instar nymph (PEB-1449), ♂ (PEB-1882) P.E. Bragg, 1992.

♂ (PEB-1959) P.E. Bragg, 1993.



Figures 1-2. *Menexenus exiguus alienigena*, dorsal view; 1. Female. 2. Male.

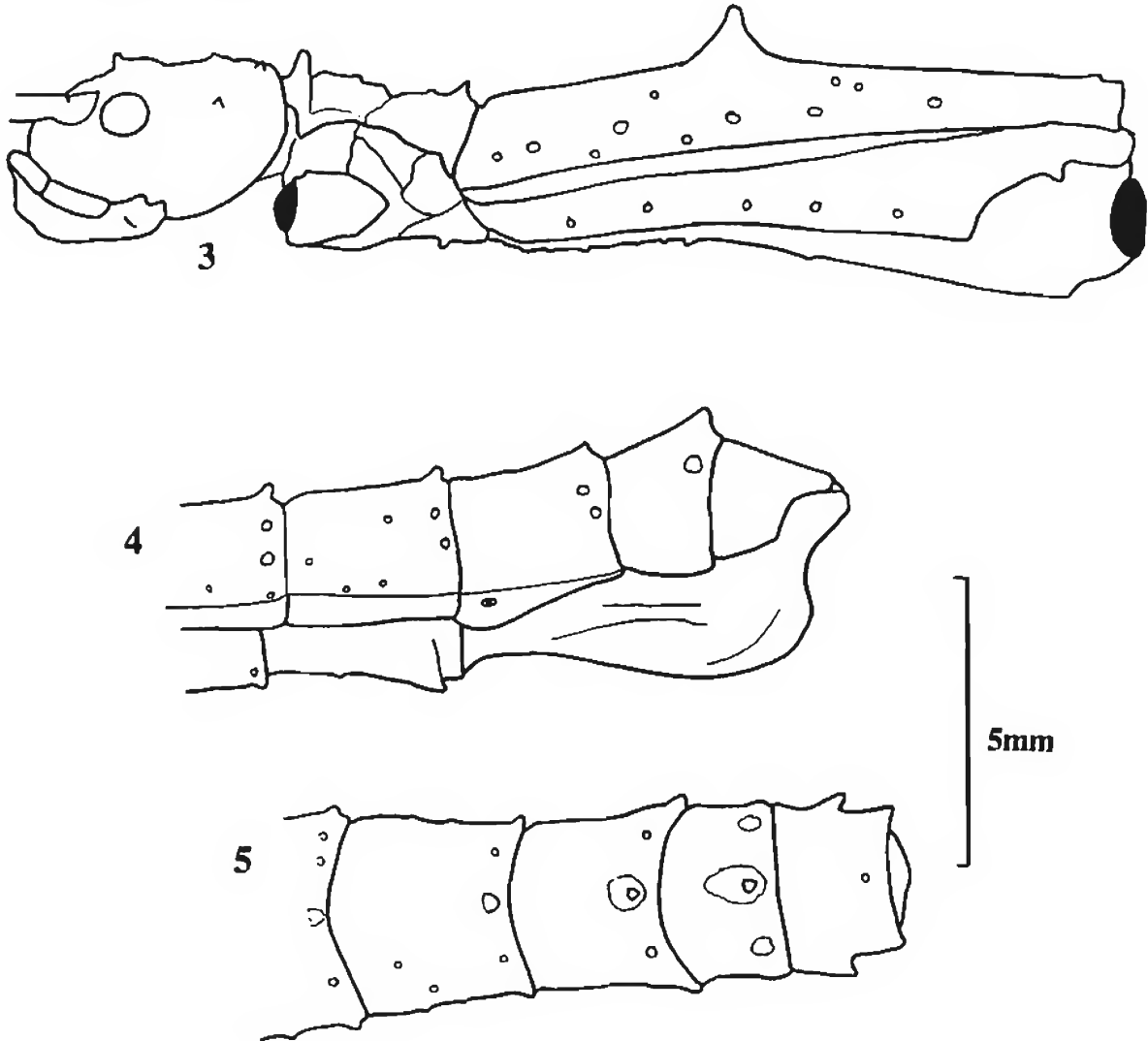
There is considerable size variation amongst the wild-caught specimens; in both sexes the smallest specimens are from Poniki summit; the Muajat specimens are similar in size to those from Poniki summit. There is little size variation in my captive reared specimens and their size suggests that they are derived from the specimens collected at BM plot C; this has been confirmed by Jonathan Cocking (personal communication).

Female (Figs. 1, 3-5)

A typical stick-shaped phasmid, with pro- meso- and metapleura projecting where the legs join the body. Whole insect uniformly dark brown. Body and head roughly granulose, almost tuberculate; wild-caught specimens more obviously granulose than reared specimens. Femora with distinctly tuberculate carinae, some almost like blunt spines; tibiae and tarsi with short setae, femora and prosternum sparingly setose. Body lengths: wild-caught 30-50mm, reared 44.5-50mm. The following description is based on the specimens from plot C and

reared specimens.

Head rectangular, one and a half times longer than wide, with a small pair of spines directly between the eyes on a slightly swollen base. Antennae almost as long as the fore legs; scape and pedicel each twice as long as wide, scape flattened, pedicel rounded and only half as long as scape.



Figures 3-5. Female.

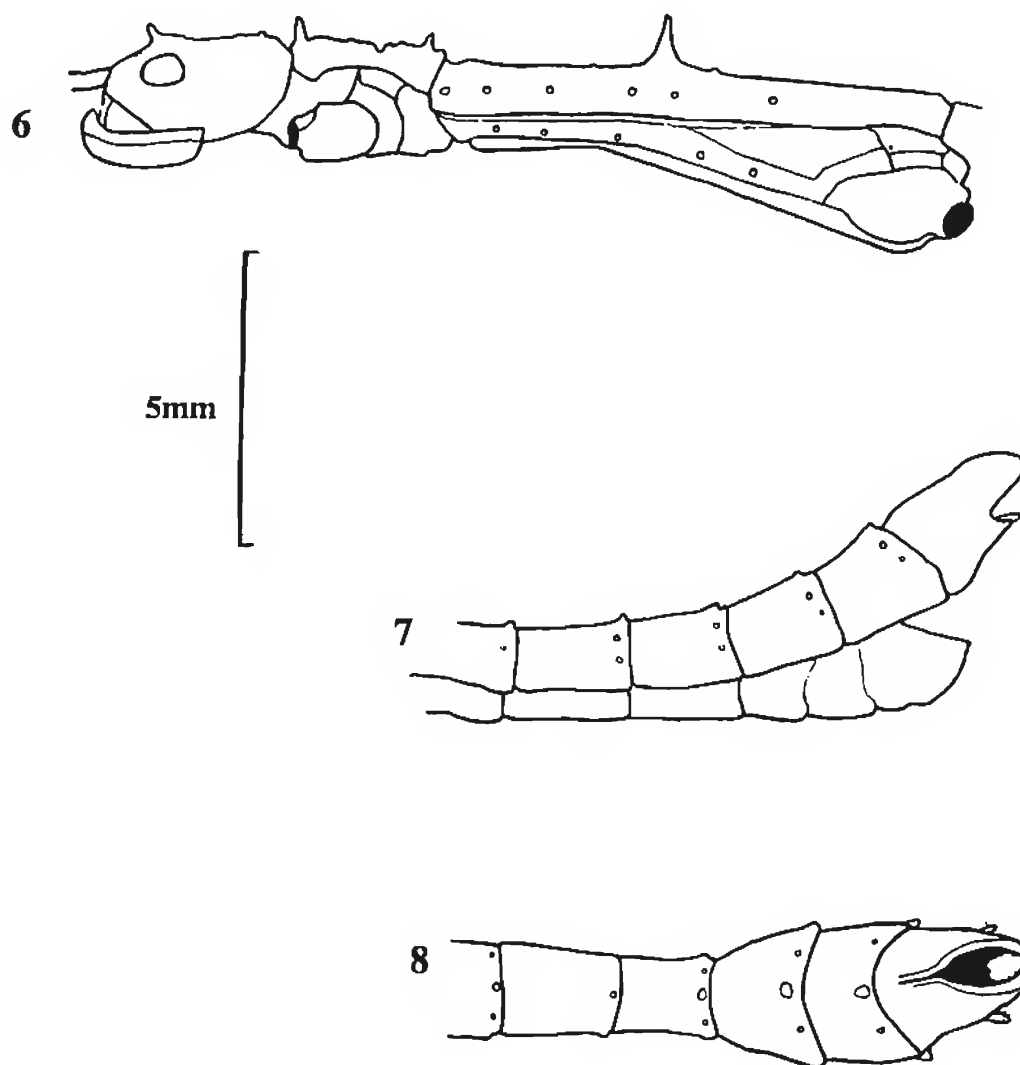
3. Head, pro- and meso-thorax. 4. Apex of abdomen, lateral view.

5. Apex of abdomen, dorsal view.

Pronotum a trapezium, as long as width of posterior; with a pair of small blunt spines on the anterior margin and a similar pair on the posterior margin. Mesonotum slightly widening towards posterior, about three times longer than width at mid-point; with a pair of spines on a swollen mound near the middle of the segment, these spines vary in size but the location is characteristic of the subspecies (those of *M. exiguus exiguus* are positioned one third of the way from the posterior margin). Mesonotum with about five distinct tubercles on each lateral margin. Metanotum and mesonotum with a broad, rather indistinct, longitudinal carina. Metanotum about as wide as long. Median segment with three obvious tubercles on the posterior margin, the central one larger than the others; abdominal segments

almost triangular lobes. Underside of thorax and abdomen as in female. Poculum rounded, reaching to end of 9th tergum, with a few tubercles. Cerci very short, blunt.

Legs as in female, except the basal tarsomere of fore tarsi are only just as long as segments 1-3 combined.



Figures 6-8. Male.

6. Head, pro-thorax and mesothorax; 7. Apex of abdomen lateral view;
8. Apex of abdomen, dorsal view.

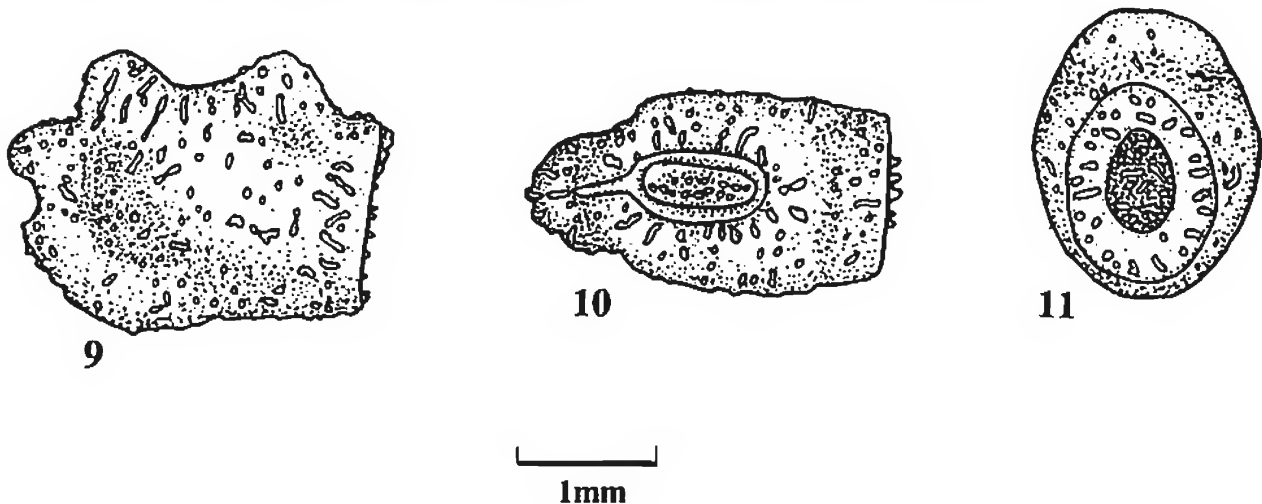
Egg (Figs 9-11)

The following description is based on reared material only.

Whole of capsule, including operculum and micropylar plate, uniformly light or mid brown, except for a dark brown depression in the operculum. Capsule and operculum covered in tubercles and short irregular ridges. Capsule a rough cuboid, longer than high and higher than wide; capsule swollen at each end of the micropylar plate, and at the opercular end of the lateral surfaces; polar mound large but with a small indentation. Micropylar plate deeply sunken into the capsule, with irregular tubercles. Operculum oval,

higher than wide; with a broad lip and a central oval depression. The egg lacks an opercular collar or capitulum.

Measurements of a typical egg are: length 2.7mm, height 2.1mm, width 1.6mm.



Figures 9-11. Egg: lateral, dorsal and opercular views.

Rearing

In captivity this species fed on bramble and oak. Females laid about 10-15 eggs per week but the eggs were very fragile and the hatch rate was low, usually less than 20%. Incubation took 3-4 months. The survival rate of the nymphs was high in humid conditions, most survived to adult. Nymphs were green on hatching but became brown within a few weeks. They reached adult in about 4-5 months. Some adults lived for over a year.

The culture of this species died out in the mid-1990s.

Acknowledgements

I thank the following people: Bruno Kneubuhler for supplying eggs and notes (incorporated above) on rearing this species in 1988; Jonathan Cocking for the loan of the RESL material which will be deposited in the Natural History Museum (BMNH) and Museum Zoologicum Bogoriense (MBBJ), and for checking details in this paper; Dr R. Emmrich for access to the SMTD collection; Oliver Zompro for the loan of photographs of the type specimens.

References

- Arnett, R.H., Samuelson, G.A. & Nishida, G.M. (1993) *The Insect and Spider Collections of the World. Flora & Fauna Handbook No. 11*. [2nd edition], Sandhill Crane Press, Gainesville, Florida.
- Günther, K. (1939) Orthoptera Celebica Sarasiniana. II. Phasmoidae. *Verhandlungen der Naturforschenden Gesellschaft in Basel*, 49: 54-92.

Stick Insects in Baltic Amber

Oliver Zompro, Max-Planck-Institut für Limnologie, AG Tropenökologie, August Thienemannstraße 2, 24306 Plön, Germany.

Abstract

This paper summarizes the knowledge of Phasmatodea in Baltic Amber. Samples of all taxa are figured. A key to subfamilies, tribes, genera and species is included.

Key words

Phasmida, Phasmatodea, Archipseudophasmatidae, Baltic Amber.

This paper summarizes a recent publication about stick insects in Baltic amber (Zompro, 2001). The Baltic amber developed in the forests of the Baltic region of the Eocene more than 40,000,000 years ago. Only three species of phasmids have been described previously; all descriptions were based on nymphs though.

The majority of the stick insects in Baltic amber belong to the extinct family Archipseudophasmatidae. This family is closely related to the Recent Pseudophasmatidae. Further research is in progress: the results will be published by the author in another paper, after a revision of the Heteronemiidae and Pseudophasmatidae. The relationship to the South East Asian Heteropterygidae, which are also being revised by the author at present, is not clear; the Archipseudophasmatidae lack the ventroapical spine of the area apicalis and sensory areas on the prosternum which are present in Heteropterygidae, furthermore, all specimens examined lack spines on the body and are very slender and not spinose and broad like the Heteropterygidae. The relationship to the Asian group Aschiphasmatae is also unclear. They have been allotted family rank by Bragg (2001) based on wing venation and usually the presence of serrated claws, a trait not exhibited by any specimen examined from Baltic amber.

The Archipseudophasmatidae feature several characters which are not found in any Recent phasmid:

- The tegmina are fully developed, as long as the alae and covering the full length of the abdomen.
- The third antennomere is strikingly elongated and at least twice as long as the length of scapus and pedicellus combined.

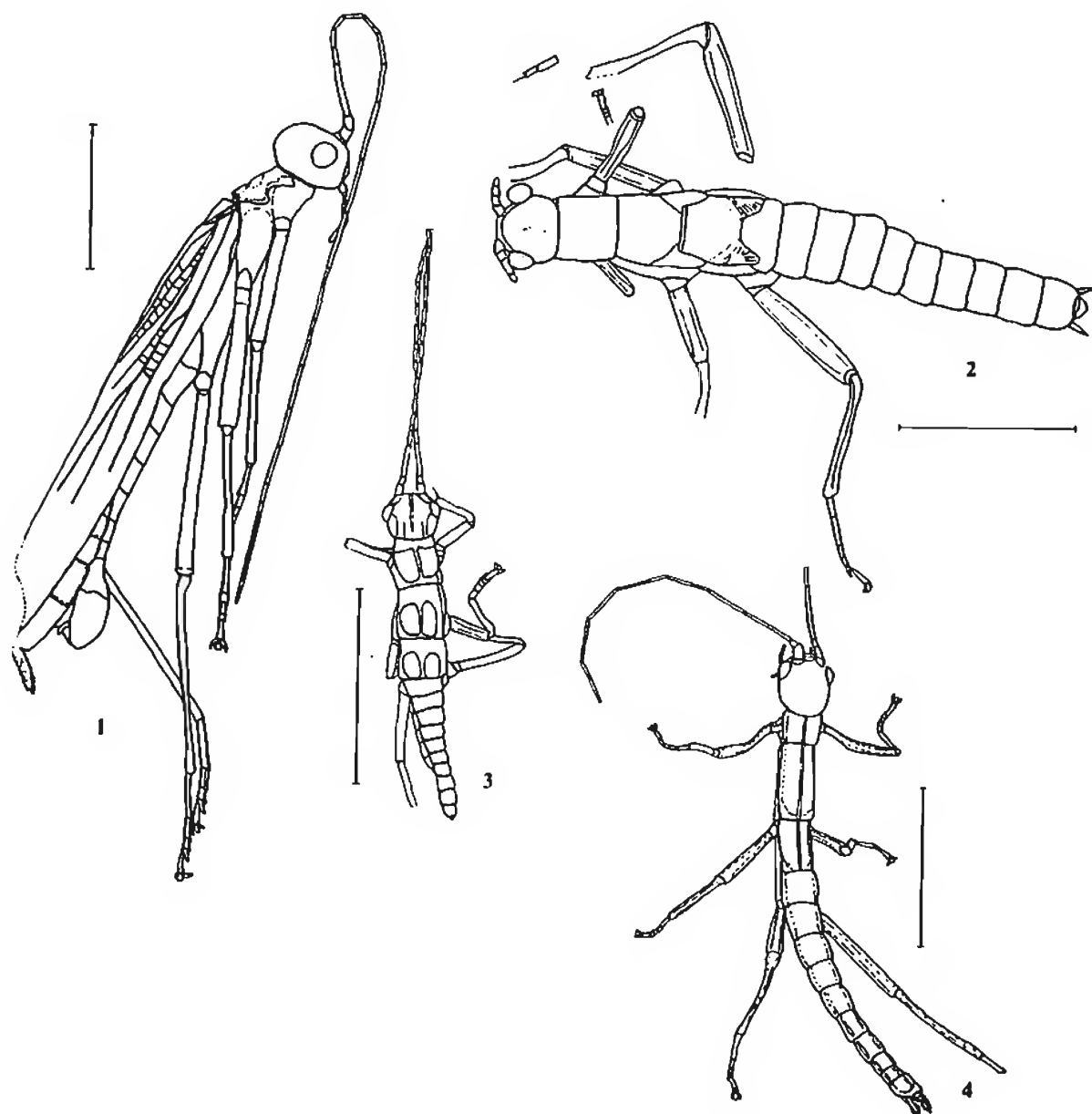
It includes two subfamilies, the Archipseudophasmatinae and an unnamed second subfamily, the latter being only recorded from young nymphs which are useless to describe and name.

The Archipseudophasmatinae feature profemora which are straight basally. They are divided into two tribes. The Archipseudophasmatini are characterized by their basitarsus, which is distinctly longer than the first two tarsomeres combined. There are two genera. *Archipseudophasma* Zompro, 2001 is easily recognizable by the structured pronotum, which exhibits lateral margins which are deeply concave in the middle; the probasitarsus is as long as the following four segments combined. It includes only one species, *Archipseudophasma phoenix* Zompro, 2001, known from two adult males. *Pseudoperla* Berendt & Pictet, 1854, features a flat and almost quadrate pronotum. The probasitarsus is at best as long as the following three tarsomeres combined. It includes *Pseudoperla gracilipes* Pictet & Berendt, 1854, known from a male nymph of stage IV.

The second tribe, Balticophasmatini, features a probasitarsus which is shorter than the following two segments. It includes the genus *Balticophasma* Zompro, 2001, with the only species *Balticophasma lineata* (Pictet & Berendt, 1854). The nymphs are easy to recognize by two strongly sclerotized "plates" on the thoracic segments.

The unnamed second subfamily features profemora which are compressed and curved basally. It includes strongly elongated phasmids, with long, slender legs. The edges of the

femora and the tibiae bear long bristles. As it is only known from nymphs, a naming is useless.



Figures 1-4.

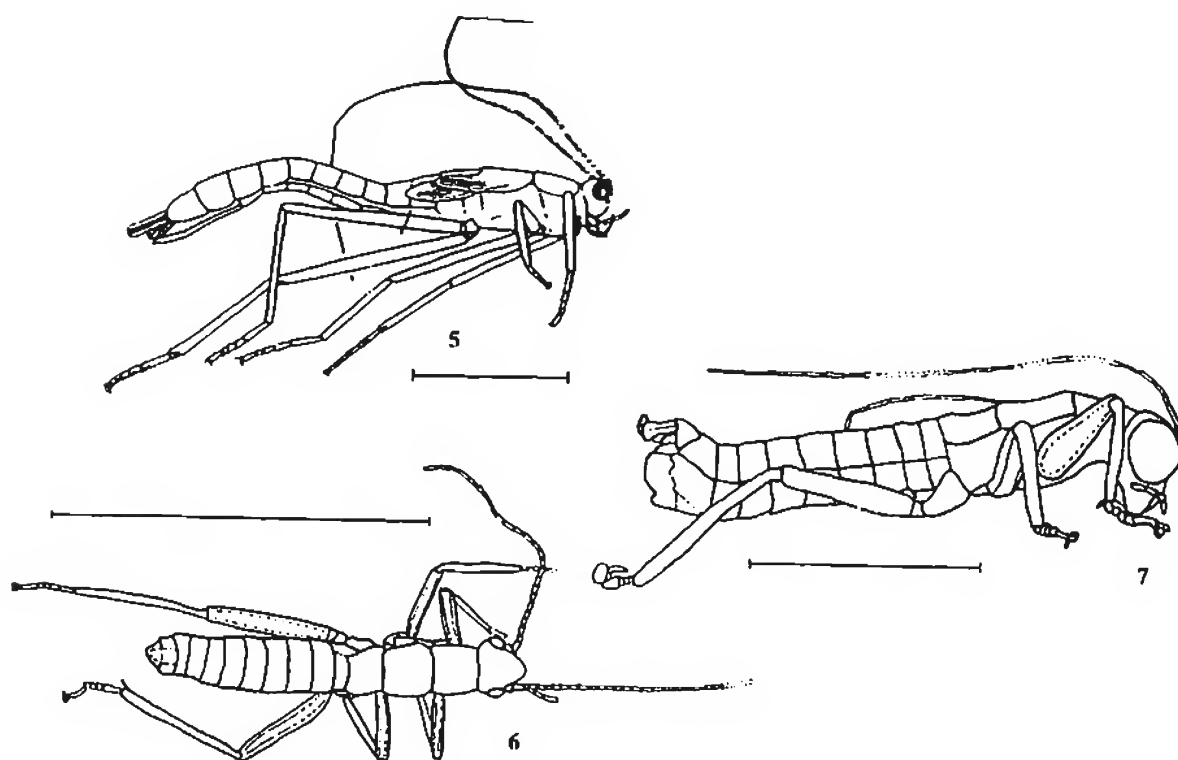
1. *Archipseudophasma phoenix* Zompro, 2001. The holotype, an adult male.
2. *Pseudoperla gracilipes* Pictet & Berendt, 1854. The holotype, a male nymph of stage IV.
3. *Balticophasma lineata* (Pictet & Berendt, 1854). The holotype, a nymph of stage II of undetermined sex.
4. The second, unnamed subfamily. A young nymph of undetermined sex.

The Pseudophasmatidae are present in Baltic amber by *Electrobaculum gracile* Sharov, 1968, belonging to the Pseudophasmatinae: Electrobaculini. Members of this group are very rare in Baltic amber.

Only very few specimens are recorded from the suborder Anareolatae, which includes the majority of the genera and species today. The young nymphs do not allow further conclusions.

Key to subfamilies, tribes and genera of Archipseudophasmatidae

1. Profemora straight, not or only slightly depressed basally. Archipseudophasmatinae..2
 - Profemora distinctly depressed and curved basally Second Subfamily.
2. Basitarsus at least as long as following three segments combined. Archipseudophasmatini..3
 - Basitarsus only slightly longer than second tarsomere. Balticophasmini: *Balticophasma* Zompro.
3. Lateral margins of pronotum straight *Pseudoperla* Berendt & Pictet.
 - Lateral margins of pronotum distinctly concave in the middle. *Archipseudophasma* Zompro.



Figures 5-7.

5. *Electrobaculum gracile* Sharov, 1968. A female nymph of stage V. After Sharov, 1968.

6. Anareolatae species. A young female nymph.

7. *Raptophasma kerneggeri* Zompro, 2001. The adult male holotype.

Other material

About 20 specimens examined by the author did not belong to Phasmatodea, and it is impossible to attach them to any insect order known to science because several characters distinguish them distinctly. The form of the genitalia and the one-segmented cerci place them near the Phasmatodea or Grylloblattodea. Nevertheless, in many characters they do not agree

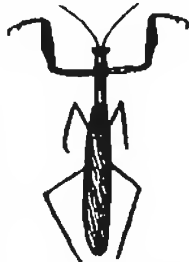
with these groups. In all probability they belong to a new order of insects. They are represented by the genus *Raptophasma* Zompro, 2001, with the only species *Raptophasma kerneggeri* Zompro, 2001. Recently the author discovered an adult male from Tanganyika (1950) and an adult female from Namibia (1909), belonging to a different genus and species. So these striking insects have survived up to our time.

Acknowledgements

The author wants to thank Ms. Anke Teschke (ALIAS, Berlin, Germany) for arranging and digitalizing the drawings and Dr. P.E. Bragg (Nottinghamshire, England) for comments on the manuscript.


References

- Arillo, A., Ortuño, V.M. & Nel, A. (1997) Description of an enigmatic insect from Baltic amber. *Bulletin de la Société Entomologique de France*, 102(1): 11-14.
- Bragg, P.E. (2001) *Phasmids of Borneo*. Natural History Publications, Kota Kinabalu, Sabah. ISBN 983-812-027-8.
- Germar, E.F. & Berendt, G.C. (1856) Die im Bernstein befindlichen Hemipteren und Orthopteren der Vorwelt. In: Berendt, G.C. (1845-1856): *Die im Bernstein befindlichen organischen Reste der Vorwelt*. 1-2. Berlin.
- Pictet, F. J. (1854) *Traité de Paléontologie ou Histoire Naturelle des Animaux Fossiles considérés dans leurs rapports Zoologiques et Géologiques*. II. 2nd edition., Paris, J.-B. Baillière. 727 pp. & Atlas, 110 pl.
- Pictet, F.J. & Hagen, H. (1856) III. Phasmodea. In: Berendt, G.C. (1845-1856): *Die im Bernstein befindlichen organischen Reste der Vorwelt*. 1-2. Berlin.
- Sharov, A.G. (1968) Filogeniya ortofteroidnykh nasekomykh. *Trudy Paleontologicheskogo Instituta* 118: 1-216.
- Zompro, O. (2001) The Phasmatodea and *Raptophasma* n. gen., Orthoptera incertae sedis, in Baltic Amber (Insecta: Orthoptera). *Mitteilungen des Geologisch-Paläontologischen Institutes der Universität Hamburg*, 85: 229-261.



An Introduction to Rearing Praying Mantids
by P.E. Bragg.

An Introduction to Rearing Cockroaches
by P.E. Bragg.



Prices: £2.50 each plus postage (20p UK; 70p Europe, £1.10 worldwide).
Order from: P.E. Bragg, 8 The Lane, Awsworth, Nottinghamshire, NG16 2QP, U.K.

Reviews and Abstracts.

Books & Compact Disks

An illustrated guide to the stick and leaf insects of Peninsular Malaysia and Singapore by Francis Seow-Choen (2000). Published by Natural History Publications (Borneo). Hardback, size 26cm x 19cm, 173 pages, 127 plates of black-and-white illustrations. ISBN 983-812-029-4. Available from P.E. Bragg, 8 The Lane, Awsworth, Nottingham, NG16 2QP, U.K. Price including postage: £20 (U.K.), £22 (worldwide).

The text is limited to the length and foodplants for each species, and descriptions of new taxa or the previously undescribed sex of known species. This includes the description of two new genera: *Sceptrophasma* Brock & Seow-Choen and *Lobonecroscia* Brock & Seow-Choen, and of seven new species (not six as stated in the introduction): *Carausius tanahrataensis* Seow-Choen, *Lopaphus suwinae* Seow-Choen, *Lobonecroscia subflava* Brock & Seow-Choen, *Presbistus fragilis* Seow-Choen, *Sceptrophasma langkawicensis* Brock & Seow-Choen, *Sipyloidea perakensis* Seow-Choen, *Sosibia brocki* Seow-Choen. Keys are given for the species in each genus but there are no keys to distinguish the genera. The bulk of the book comprises 127 pages of drawings, with one species illustrated per page.

Phasmids of Borneo by P.E. Bragg (2001). Published by Natural History Publications (Borneo). Hardback, size 26cm by 19cm, 772 pages, 800 line drawings, 24 colour plates. ISBN 983-812-027-8. Available from P.E. Bragg, 8 The Lane, Awsworth, Nottingham, NG16 2QP, U.K. Price including postage: £105 (U.K.), £120 (worldwide).

Borneo is the third largest island in the world and much of it is still largely unexplored and covered in tropical rainforest. With more than 10% of the world's species being found on this one island, Borneo is arguably the best habitat for stick insects.

In 1838 Hermann Burmeister described the first Bornean stick insect. During the next 100 years almost 300 species were recorded from Borneo. There was then a gap of almost 50 years when no new species were recorded from Borneo. However, during the last decade 53 new species have been described: 48 by the author of this book, including 32 which are described here for the first time.

This is the first book to deal specifically with phasmids of Borneo. There are over 800 illustrations of stick insects and their eggs. With keys for the identification of species in all the smaller subfamilies, it is invaluable to anyone interested in identification of this group of Bornean insects. The book contains comprehensive synonymies for all the species recorded from Borneo and highlights a number which have been recorded by mistake. In addition the book includes a world wide check list of phasmid genera with all the type species listed.

New taxa described include the family Aschiphasmatidae, the tribe Dajacini, six genera and subgenera: *Anoplobistius*, *Chlorobistius*, *Eurybistius*, *Kerabistius* (*Kerabistius*), *Kerabistius* (*Rhadinobistius*), *Yongtsuius*, and 32 new species and subspecies; one of the new species is described from India. Type species are selected for two genera: *Prosentoria* and *Dinophasma*. Lectotypes are designated for 14 species. Fourteen new synonyms are recorded and two invalid synonyms are corrected.

Phasma Newsletters The first 40 newsletters of the Dutch publication *Phasma* (1991-2000) have been put on a CD-rom, each page separately scanned. An index has been included. Additionally 34 websites about stick and leaf insects have been included. The CD-rom can be obtained from Wim Potvin, Brusselbaan 7, 1600 St.-Pieters-Leeuw, Belgium. Price €15, excluding postage and packing.

Wandelnde Blätter. Ein Katalog aller bisher beschriebenen Phylliinae-Arten und deren Eier mit drei Neubeschreibungen by Detlef Größer (2001). Published by Edition Chimaira, Frankfurt am Main, Germany. Hardback, 15cm by 21.5cm, 119 pages, 136 figures, including 69 colour illustrations. [In German with English and Japanese summaries]. Price DM48. ISBN 3-930612-46-1. Reviewed by Oliver Zompro.

This book is the first comprehensive publication about the walking leaves, one of the most striking groups of the Phasmatodea. The author, Detlef Größer, is the most accepted expert in this group, and this is obvious on every single page. All species of the four genera of the family: *Chitoniscus* Stål, 1875, *Microphyllium* Zompro, 2001, *Nanophyllum* Redtenbacher, 1906 and *Phyllium* Illiger, 1798 with its subgenus *Pulchriphyllum* Griffini, 1898 are figured, and the majority in excellent half or full page colour illustrations.

The book starts with a short characterization of this group, followed by distribution maps and a well illustrated chapter on morphology, which makes it possible for non-specialists to understand the more scientific parts of the book. The stridulation in this group is discussed, and the stridulatory organs of several species are figured for the first time. The wing venation is briefly discussed: the figure contains one of the few errors, the vein named "cubitus" should read "radius". Nymphs of several species are figured in colour, including a sequence of a moulting. The chapter on colour variation includes some very striking forms from Detlef Größer's cultures, also in excellent colour pictures. The species section includes pictures of both sexes and the egg, if known, many are figured in full page colour. Three species are described and figured for the first time: *Phyllium* (*Pulchriphyllum*) *exsectum* Zompro, *P. (Phyllium) palawanensis* Größer, and *P. (Phyllium) zomproi* Größer.

The appendix includes a list of the museums where the type material of Phylliidae is housed, English and Japanese summaries, a reference list, and a catalogue of all species described, including the synonyms.

All in all it is one of the nicest publications in recent years and, considering the number and quality of the pictures, at a very modest price. Specialists and enthusiasts should not miss this unique book.

Phasmid Abstracts

The following abstracts briefly summarise articles which have recently appeared in other publications. Some of these may be available from local libraries. Others will be available in university or college libraries, many of these libraries allow non-members to use their facilities for reference purposes free of charge.

The editor of *Phasmid Studies* would welcome recent abstracts from authors so that they may be included in forthcoming issues. In the case of publications specialising in phasmids, such as *Phasma*, only the longer papers are summarised.

Brock, P.D. (2000) A new species of *Dajaca* Brunner (Phasmida: Pseudophasmatidae) from Vietnam. *Journal of Orthoptera Research*, 9: 1-3.

Dajaca napolovi sp.nov. is described and illustrated. The species is based on two pairs collected from North Vietnam in 1998 which differ from existing taxa by distinctive coloration. A key is given to distinguish the *Dajaca* species.

Brock, P.D. (2000) Studies on Australian stick-insects of the family Heteronemiidae, subfamily Lonchodinae, including the description of a new genus. *Journal of Orthoptera Research*, 9: 51-55.

A lectotype has been designated for *Carausius australicus* Brunner, 1907, which is listed as a new synonym of *Carausius mercurius* Stål, 1877. This species and *Lonchodes nigropunctatus* Kirby, 1896 (so far only reported from Queensland) have been transferred to a new genus, *Austrocarausius*, with *L. nigropunctatus* designated as the type species. Adults are redescribed. Eggs of both species are described for the first time. Figures of adults and eggs are given.

Chen S., Chen P. & Wang J. (1999) A study on the regeneration of artus in genus *Sinophasma* Günther. *Acta Entomologica Sinica*, 42(2): 159-165. [in Chinese]

Phasmatodea is a group of insects with strong regeneration ability of leg autotomy. Results of our experimental studies on 3 species of genus *Sinophasma* Günther indicate that this ability is closely related with time and number of legs amputated: (1) If 1 or 2 legs were amputated at 1st to 4th instar, length of the regenerated legs of the adults or of the last instar, are close to those of the normal insects (the control); (2) If the same amputation (1 or 2 legs) was done at beginning of 5th instar, lengths of the regenerated legs of the adult insects are shorter than those of the control; (3) If legs were amputated at 6th instar or adult stage no regeneration is possible, (if at 6th instar legs regenerated as usual, the nymph stage will prolong to 7th instar). Other results are: (1) When 3 or more legs amputated, the insects can not survive, death follows within 2 or 3 days. (2) Rate of growth of the regenerate legs is faster than that of the normal legs and rate increases with the increase of instar stage. (3) Either regenerated or normal legs elongate only when moulting.

Chen S. & Chen P. (1999) A new species of the genus *Sinophasma* from Viet Nam (Phasmatodea: Heteronemiidae). *Acta Entomologica Sinica*, 42(3): 300-302. [in Chinese]

A new species of the genus *Sinophasma* Günther from Vietnam, *Sinophasma vietnamense* sp.nov., is described. Type specimens are preserved in the Institute of Zoology, Academia Sinica.

Chen S.C. & He Y.H. (2000) Two new species of Phasmatodea (Phasmatodea: Anareolatae) from South China. *Entomotaxonomia*, 22(1): 17-19. [in Chinese]

This paper deals with two species belonging to Phasmatidae and Heteronemiidae, collected from Jiangxi and Guangxi, China are reported as new to science. The type specimens are kept in the Institute of Zoology, Academia Sinica. The new species are diagnosed as follows. 1. *Paraentoria lushanensis*, sp.nov. (Figs. 1, 2). This new species is allied to *P. sichuanensis* Chen & He, it differs from the latter in body covered with sparse setae, lobes on the base of middle femur not divided and with distinct dorsal lobes near base on hind femur and tibia. Male: unknown. Holotype female, Mt. Lushan, Jiangxi, July 16, 1936, collected by O. Piel; Paratype female, locality same as holotype, but with no date and collector. 2. *Sinophasma atratum*, sp.nov. (Figs. 3, 4). This new species is close to *S. largum* Chen & Chen, but the colour pattern of body and legs different, granules on mesonotum concentrated mainly on side of longitudinal carina, subgenital plate with nearly two symmetrical valvulae backward. Female: unknown. Holotype male, Napo Co., 1300m, Guangxi, 15.viii.1998, collected by Huang Fusheng.

Heer, J. de (2001) Enige korte notities over het voedsel van PSG 89 *Sosibia parvipennis* en PSG 222 *Sipyloidea* sp. Papua Nieuw-Guinea. *Phasma*, 11(42): 45. [in Dutch]

Newly hatched nymphs of *Sosibia parvipennis* Stål (PSG 89) need *Hypericum* as food to grow, otherwise a lot of nymphs will die; they accept bramble when larger. *Sipyloidea* sp. from New Guinea (PSG 222) readily accepts bramble from the first instar without significant mortality although they really like *Hypericum*.

Mantovani, B., Passamonti, M. & Scall, V. (2001) The mitochondrial cytochrome oxidase II gene in *Bacillus* stick insects: Ancestry of hybrids, androgenesis, and phylogenetic relationships. *Molecular Phylogenetics and Evolution*, 19(1): 157-163.

Sequencing of a cytochrome oxidase II (COII) gene fragment in *Bacillus* taxa provided evidence that the bisexual *B. rossius* is the maternal ancestor of the hybridogenetic *B. rossius-grandii* strains and revealed the same ancestry for both parthenogenetic hybrids: the diploid *B. whitei* (*B. rossius/grandii grandii*) and the triploid *B. lynceorum* (*B. rossius/grandii grandii/atticus*). Present data clearly demonstrate that all *Bacillus* unisexuals arose through asymmetrical hybridization events and realized a paraphyletic derivation from the *B. rossius redtenbacheri* subspecies. The invention of *B. rossius* mitochondrial DNA haplotypes in specimens with *B. grandii grandii* nuclear genomes revealed the occurrence of androgenesis in nature. Natural androgens represent a peculiar escape from hybridity and can help maintain the hybridogenetic system through the production of the fathering taxon via hybrid females. Results from the COII gene support the phyletic relationships among taxa suggested by previous taxonomical approaches, but also indicate a departure of *B. grandii* subspecies from the established taxonomy. Assuming the existence of a molecular clock, the evaluated substitution rate brings the splitting between *B. rossius* and *B. grandii/B. atticus* back to 22.79 ± 2.65 myr before present, while the origin of hybrids appears to be much more recent (1.06 ± 0.53 myr).

Potvin, W. (2001) *Dryococelus australis* bestaat weer... *Phasma*, 11(42): 28-29. [in Dutch]

Dryococelus australis (Montrouzier) from Lord Howe Island appeared to be extinct due to imported rats, but some scientists recently found three females and some eggs on rocky coastline. They intend to breed this stick insect in captivity and reintroduce it on Lord How Island, after exterminating the rats.

Potvin, W. (2001) Soortbeschrijving van *Phaenopharos struthioneus* (Westwood), PSG nr. 205. *Phasma*, 11(42): 42-44. [in Dutch]

Brief descriptions of the adults and eggs of *Phaenopharos struthioneus* (Westwood) (PSG culture 205) are given. Their typical defensive behaviour is explained and housing, feeding, care and breeding of this wonderful large species are discussed. Possible colour variations due to the influence of light and humidity are given. The paper includes drawings of both sexes and photographs of eggs and the female.

Potvin, W. (2001) Soortbeschrijving van *Phenacephorus auriculatus* (Brunner, 1907), PSG nr. 162. *Phasma*, 11(43): 76-78. [in Dutch]

Brief descriptions of the adults and eggs of *Phenacephorus auriculatus* (Brunner, 1907) (PSG 162) are given. Their defensive behaviour is explained and housing feeding, care and breeding of this small species are discussed. This species seems to disappear in captivity and needs some extra attention. It can be an easy species to breed if given the correct conditions. With colour photographs of the male and female, and black-and-white photograph of the egg.

Rabaey, K. (2001) Kweekbeschrijvingen van *Medaura jobrensis* Brock & Cliquennois, 2000, PSG-nr. 202 en *Medaura scabriuscula* (Wood-Mason, 1873), PSG-nr. 216, met een vergelijking tussen beide soorten. *Phasma*, 11(43): 71-75. [in Dutch]

Nicholas Cliquennois has collected phasmids during his two year stay in Bangladesh. The author obtained all his collected species and managed to bring them into culture. She gives a short description of the two *Medaura* species, describes how to breed them in captivity and compares both species.

Wright, K. (2001) The fantasmagoric Australian giant prickly stick-insect, *Extatosoma tiaratum* (Macleay). *Insecta*, 1: 16-23.

Notes on rearing *Extatosoma tiaratum* (Macleay), with 12 colour photographs.

Zompro, O. (2000) Designation of type-species of 13 stick-insect genera described by J. Redtenbacher (Insecta: Orthoptera: Phasmatodea). *Annalen des Naturhistorischen Museums in Wien Serie B Botanik und Zoologie*, 102B: 93-96.

Type-species of several genera of the insect order Phasmatodea, described by Redtenbacher, are designated. The genera are: *Agrostia*, *Anisacantha*, *Antongilia*, *Brizoides*, *Citrina*, *Eucles*, *Euphasma*, *Hypocyrtus*, *Mirophasma*, *Neophasma*, *Paraphasma*, *Paraprisopus*, *Perliodes*.

Zompro, O. (2001) A new species of stick insect (Phasmatodea: Heteropterigidae: Obriminae: Obrimini) from Cebu Island, Philippines. *Philippine Entomologist*, 15(1): 23-26.

A new species of *Theramenes* Stål, 1875, *Theramenes mandirigma* Zompro & Eusebio (Phasmatodea: Heteropterigidae: Obriminae: Obrimini) is described and illustrated from the Philippine island of Cebu. It differs from the only other species in the genus, *T. olivaceus* (Westwood, 1859) by the number of tubercles on the tergum and the smaller size.

Zompro, O. (2001) A generic revision of the insect order Phasmatodea: The New World genera of the stick insect subfamily Diapheromeridae: Diapheromerinae = Heteronemiidae: Heteronemiinae sensu Bradley & Galil, 1977. *Revue Suisse de Zoologie*, 108(1): 189-255.

The North and South American genera of the phasmatodean subfamily Diapheromerinae = Heteronemiinae sensu Bradley & Galil are revised. All genera are redescribed, type species are mentioned or designated, and synonyms listed. Two new tribes, Ocnophilini and Oreophoetini, are established, and the Libethrini are synonymized with Diapheromerini. Genitalia, eggs and important other characters of most genera are figured. Ten new genera are introduced and five new species are described. Previously unknown males, females and eggs of several species are described. The genera are arranged in groups, with separate keys to all tribes and generic-level groups, including males, females, and eggs to the extent currently known.

The author has sent the following note to *Phasmid Studies*: The paper includes a mistake. I overlooked that Kirby (1904: 431) selected *Caulonia bifolia* Stål, 1875 as type species for *Caulonia* Stål, 1875, so Hebard's designation (1919) of *Ceroys rabdota* Westwood, 1859 was antedated and is therefore invalid. *Caulonia* is preoccupied by *Caulonia* Lorient, 1873, a genus of Echinodermata. *Caulonia* is not synonymous with *Libethra* Stål, 1875 as stated by most authors and therefore needs a replacement name. *Caulonia bifolia* and *C. rabdota* are congeneric. *Rugosolibethra* Zompro, 2001 is the only available (subjective) synonym and therefore becomes valid.

Zompro, O. (2001) Philippine phasmids from the collection of the Staatliches Museum für Tierkunde, Dresden (Insecta: Phasmatodea). *Reichenbachia*, 34(5): 49-56.

The male and egg of *Hoploclonia armadillo* (Redtenbacher, 1906) are described and figured for the first time. A new genus of Phylliidae, *Microphyllium*, is erected for *Microphyllium spinithorax* n.gen., n.sp., the smallest member of the family. The new genus is closest related to *Chitonischus* Stål, 1875. A lectotype is designated for *Dares haematocanthus* Redtenbacher, 1906, which is transferred to *Hoploclonia* Stål, 1875. The egg of *Lonchodes mindanaense* (Brunner, 1907) is described for the first time.

Zompro, O. & Hennemann, F. (2001) A new species of *Autolyca* Stål, 1875 from El Salvador (Phasmatodea: Pseudophasmatidae: Anisomorphini). *Nachrichten des entomologischen Vereins Apollo*, N.F. 22(3): 175-176.

The male, female and egg of a new species of Phasmatodea, *Autolyca daemonia* n.sp., are described from El Salvador. It is closely related to the type species, *Autolyca pallidicornis* Stål, 1875, but differs in its annulated antennae and the comparatively shorter legs. The holotype male is housed in the Forschungsinstitut und Natur-Museum Senckenberg, Frankfurt am Main (SMF-no. Phasm-8).

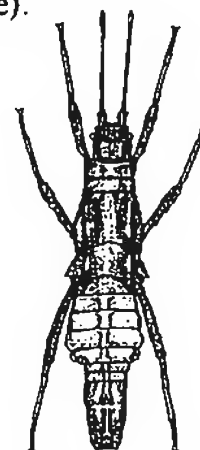
PHASMIDS of BORNEO

by P.E. Bragg

ISBN 983-812-027-8.

26cm x 19cm, 772 pages, 800 drawings, 24 colour photographs, 148 maps.

Price, including postage: £105 (U.K.), £120 (worldwide).



An Illustrated guide to the Stick and Leaf Insects of Peninsular Malaysia and Singapore

by F. Seow-Choen

ISBN 983-812-029-4.

26cm x 19cm, 173 pages, 127 black-and-white plates.

Price, including postage: £20 (U.K.), £22 (worldwide).

Available from: P.E. Bragg, 8 The Lane, Aysworth, Nottingham, NG16 2QP, U.K.

Contributions

1. Articles are welcome from anyone and the editor is prepared to offer advice and help to contributors. The editor would like to encourage people with no previous experience to write articles for the *Phasmid Studies*.
2. Articles should generally be between 500 and 10000 words long although articles shorter or longer will be considered.
3. Articles are reviewed by independent referees at the discretion of the editor.
4. Articles are accepted for publication in *Phasmid Studies* on the understanding that they may be translated and reproduced in *Phasma*.
5. Authors will be provided with 25 offprints.
6. Contributions should be addressed to: Dr. P.E. Bragg, 8 The Lane, Awworth, Nottinghamshire, NG16 2QP, U.K.

Instructions to authors

Articles for publication in *Phasmid Studies* should initially be submitted in printed form only, and with double line spacing; disks will be requested at a later stage. Refer to a recent copy of *Phasmid Studies* for layout of articles. In particular the following points should be noted.

1. The title should be followed by the author(s) name and address, an abstract, a list of key words, an introduction (if necessary), the main article, and finally a list of references.
2. The abstract should briefly summarise the article. For short articles one or two sentences should suffice; for longer articles the abstract should not exceed 400 words.
3. A list of key words should be given. These should cover the main topics in the article but there should not be more than 25 key words.
4. All titles and headings should be in bold print and not underlined. The main title and all side-headings should be aligned on the left hand side of the page. If the article is lengthy major headings may be created by using centred headings in bold print.
5. Paragraphs should be indented using a single tab setting (not character spaces).
6. The full stop at the end of sentences should be followed by a double space. Full stops not at the end of a sentence should be followed by a single space.
7. Scientific names should be in italics (or underlined if italics are not available). On the first usage names should be given in full, followed by the name of the author. On subsequent occasions the genus should be abbreviated to a single letter followed by a full stop, and the author should be omitted.
8. English, not American, spellings should be used throughout.
9. Numbers between one and ten should be spelled out while numerals should be used for 11 and above; the exceptions to this are where measurements are involved, or in descriptions of insects, in both cases numerals may be used throughout.
10. Where measurements are given a space should not be left between numerals and units e.g. 6mm, not 6 mm.
11. References in the text should include the author and date, and page number if appropriate, these should be given in the form Smith (1982: 123), or (Smith, 1982: 123). In the references section, the names of authors and the volume numbers of journals should be printed in bold. Journal titles and book titles should be given in full (not abbreviated) and should be printed in italics.
12. Illustrations should have printed (not handwritten) labels.
13. Drawings should be in black ink and on separate sheets of paper, not with the text of the article. The size of reproduction will usually be determined by the editor. Usually drawings look better when reduced to about half their original size and contributors should bear this in mind. Scale lines must be used, not the magnification of the original drawing.
14. Proofs will be sent to the author to be checked before publication.
15. The abbreviation *PSG* may be used to refer to the *Phasmid Study Group*; with this exception, the full titles should be used for all organisations and publications.
16. Disk copies should conform to the following:
 - i) IBM compatible 3.5" computer disk, double or high density (720K or 1.44MB).
 - ii) Files should be in *WordPerfect 5.1*, or if written on a different word processor, the file must also be saved as *Dos Text* or as an ASCII file.
17. If the wordprocessor used does not have a table facility then tables of measurements etc. should be laid out using tab settings (not character spaces).

Contents

<i>Caledoniophasma marshallae</i> , a new genus and species of Phasmatodea Oliver Zompro	29
More Bornean records of <i>Necrosia prasina</i> (Burmeister, 1838) P.E. Bragg	34
<i>Menexenus exiguus alienigena</i> Günther, 1939 from Sulawesi P.E. Bragg	35
Stick Insects in Baltic Amber Oliver Zompro	41
Reviews and Abstracts Books & Compact Disks Phasmid Abstracts	45 46